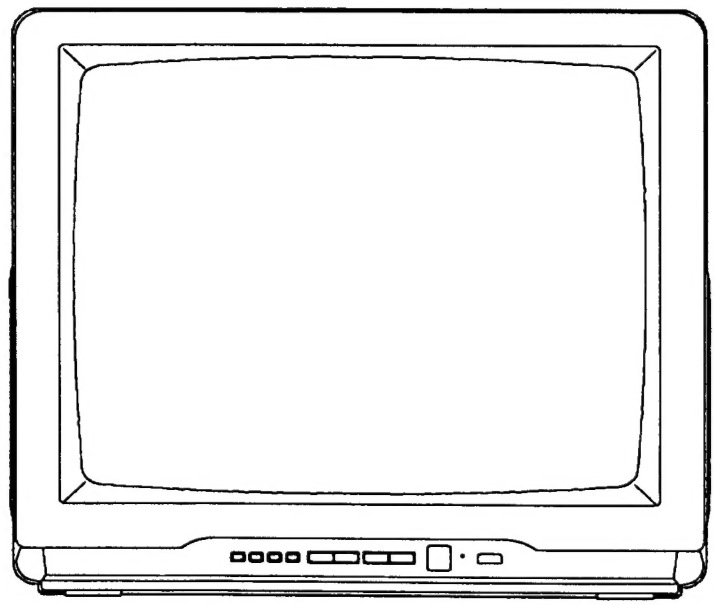
FUNAI

SERVICE MANUAL

20" COLOR TELEVISION

TV-2000A MK7



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IMPORTANT SAFETY NOTICE

Proper service and repair is important to the safe, reliable operation of all Funai Equipment. The service procedures recommended by Funai and described in this service manual are effective methods of performing service operations. Some of these service special tools should be used when and as recommended.

It is important to note that this service manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It also is important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Funai could not possibly know, evaluate and advice the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Funai has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by Funai must first use all precautions thoroughly so that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

TABLE OF CONTENTS

GENERAL SPECIFICATIONS *

FEATURE and SPECIFICATIONS

Color System:	PAL - B/G, SECAM - B/G, D/K NTSC 4.43/3.58MHz (Video In only)
Tuning System:	Voltage Synthesizer
Receivable Channels: - (OIRT + CCIR ch) -	VHF-L; R1~R5 / E2~E4 ch (X~S2) VHF-H; R6~R12 / E5~E12 ch (S3~S10) UHF; 21~69 ch CATV-Mid
Numer of Present:	up to 50
Antenna Impedance:	UHF/VHF 75Ω, Unbalanced
Picture Tube:	14", Tinted
Picture Control: (Remote)	Color, Brightness, Contrast and Video mode (Sharp/Soft)
Picture Control Memory: (Remote)	Standard - Select
Speaker:	77m/m, Round Type, 8Ω
Output Power:	1W, 10% THD
Other Features:	Automatic Channel Programming Automatic Degaussing
Power Source:	220-240V, 50Hz AC
Power Consumption:	70W
Cabinet Size:	366(W) x 35(D) x 32(H) mm (Approx)
Weight:	9Kg (Approx)
Regulations:	IEC-65 Passable

JACK AND TERMINALS

UHF/VHF Antenna:	75Ω IEC Jack
Video In Jack:	BNC Jack
Audio In Jack:	RCA Jack
EARPHONE:	3.5mm CES

CONTROL and SWITCHES

Power:	Push (Front)
Channel Up/Down:	Push (Front)
Volume Up/Down:	Push (Front)
Tuning Up/Down:	Push (Front)
Program:	Push (Front)
Auto Memo/Band:	Push (Front)
Remote Control:	Standby
(20keys)	0/AV 1~9
	Channel Up/Down
	Control& Volume Up/Down
	Picture Select (Bright/Contrast/ Color/Video Mode)
	Previous
	Mute
	Sleep
	Display

DISPLAY

LED Indicator:	LED (Red)
	* When turning on the power, the stand-by LED will turn off.
On Screen Display:	Channel
	Volume
	Brightness
	Color
	Contrast
	Sharp-Soft
	Sleep Timer (10~90 Minute)
	Tuning Indicator
	Band Position

ACCESSORIES

Remote Control Transmitter	
Batterry:	UM3 x 2
Owner's Manual	
Rod Antenna	

*** Specifications are subject to change without notice.**

PERFORMANCE SPECIFICATIONS

< Tuner >

ANT. Input ---------- 75Ω Unbalanced, IEC connector
Reference Level ---------- 300mVp-p at Video Output
Test Input Signal ---------- 400Hz 30% modulation

Description	Condition	Unit	Nominal	Limit
1. Peak Picture Sens	VHF	dBμV	20	30
	UHF	dBμV	30	40
2. AFT Pull In Range (80dBμ input)	—	MHz	±1.0	±0.7
3. Intermediate Freq.	Picture	MHz	38.0	—
	Sound	MHz	31.5 (D/K)	—
	Sound	MHz	32.5 (B/G)	—
4. Intercarrier Freq.	—	MHz	6.5 (D/K)	—
	—	MHz	5.5 (B/G)	—

< Deflection >

Description	Condition	Unit	Nominal	Limit
1. Deflection Freq.	Horizontal (PAL/SECAM)	KHz	15.625	—
	(NTSC)	KHz	15.75	—
	Vertical (PAL/SECAM)	Hz	50	—
	(NTSC)	Hz	60	—
2. Linearity	Horizontal	%	—	±15
	Vertical	%	—	±15
3. High Voltage	—	KV	23	—

< Video & Chroma>

Description	Condition	Unit	Nominal	Limit
1. Misconvergence	Center	mm	—	0.4
	Side	mm	—	1.5
	Corner	mm	—	2.0
2. Over Scan	Horizontal	%	10	—
	Vertical	%	10	—
3. Color Temperature	—	K	8000K-10MPCD	—
4. Resolution	Horizontal	Line	300	—
	Vertical	Line	300	—
5. Brightness	APL 100%	Ft-L	45	35

<Audio>

All items are measured across 16Ω resistor at speaker output terminal.

Description	Condition	Unit	Nominal	Limit
1. Audio Output Power	10% THD	W	1.2	0.8
2. Audio Distortion	500mW	%	2	5
3. Audio Freq. Response	-6dB	Hz	—	100~6K

IMPORTANT SAFETY PRECAUTIONS

Prior to shipment from the factory, our products are strictly inspected for recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

Safety Precautions for TV Circuit

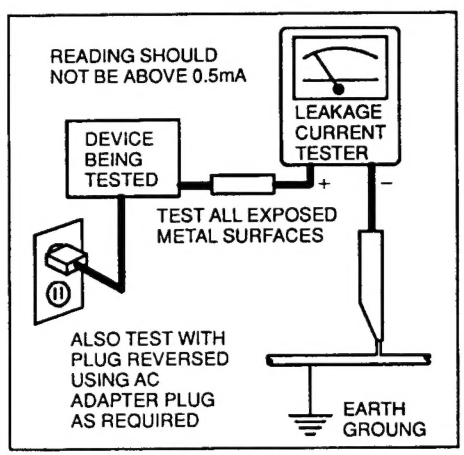
1. **Before returning an instrument to the customer,** always make a safety check of the entire instrument, including, but not limited to, the following items:

   a. Be sure that no built-in protective devices are defective and have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including but not limited to, nonmetallic control knobs, insulating fishpapers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks. **Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning. Servicers who defeat safety features or fail to perform safety checks may be liable for any resulting damage.**

   b. Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) spacing between the picture tube and the cabinet mask, (2) excessively wide cabinet ventilation slots, and (3) an improperly fitted and/or incorrectly secured cabinet back cover.

   c. **Antenna Cold Check -** With the instrument AC plug removed from any AC source, connect an electrical jumper across the two AC plug prongs. Place the instrument AC switch in the on position. Connect one lead of an ohmmeter to the AC plug prongs tied together and touch the other ohmmeter lead in turn to each tuner antenna input exposed terminal screw and, if applicable, to the coaxial connector. If the measured resistance is less than 1.0 megohm or greater than 5.2 megohm, an abnormality exists that must be corrected before the instrument is returned to the customer. Repeat this test with the instrument AC switch in the off position.

   d. **Leakage Current Hot Check -** With the instrument completely reassembled, plug the AC line cord directly into a AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester. With the instrument AC switch first in the on position and then in the off position, measure from a known earth ground (metal water pipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle brackets, metal cabinet, screw heads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 0.5 milliampere. Reverse the instrument power cord plug in the outlet and repeat the test.



ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER OR BEFORE CONNECTING THE ANTENNA OR ACCESSORIES.

   e. **X-Radiation and High Voltage Limits -** Because the picture tube is the primary potential source of X-radiation in solid-state TV receivers, it is specially constructed to prohibit X-radiation emissions. For continued X-radiation protection, the replacement picture tube must be the same type as the original. Also, because the picture tube shields and mounting hardware perform an X-radiation protection function, they must be correctly in place. High voltage must be measured each time servicing is performed that involves B+, horizontal deflection or high voltage. Correct operation of the X-radiation protection circuits also must be reconfirmed each time they are serviced. (X-radiation protection circuits also may be called "horizontal disable" or "hold down.") Read and apply the high voltage limits and, if the chassis is so equipped, the X-radiation protection circuit specifications given on instrument labels and in the Product Safety & X-Radiation Warning note on the service data chassis schematic. High voltage is maintained within specified limits by close tolerance safety-related components/adjustments in the high-voltage circuit. If high voltage exceeds specified limits, check each component specified on the chassis schematic and take corrective action.

2. Read and comply with all caution and safety-related notes on or inside the receiver cabinet, on the receiver chassis, or on the picture tube.

3. **Design Alteration Warning -** Do not alter or add to the mechanical or electrical design of this TV receiver. Design alterations and additions, including, but not limited to circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this receiver and create a hazard to the user. Any design alterations or additions will void the manufacturer's warranty and may make you, the servicer, responsible for personal injury or property damage resulting therefrom.

4. **Picture Tube Implosion Protection Warning -** The picture tube in this receiver employs integral implosion protection. For continued implosion protection, replace the picture tube only with one of the same type number. Do not remove, install, or otherwise handle the picture tube in any manner without first putting on shatterproof goggles equipped with side shields. People not so equipped must be kept safely away while picture tubes are handled. Keep the picture tube away from your body. Do not handle the picture tube by its neck. Some "in-line" picture tubes are equipped with a permanently attached deflection yoke; because of potential hazard, do not try to remove such "permanently attached" yokes from the picture tube.

5. **Hot Chassis Warning -**
   a. Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord and may be safety-serviced without an isolation transformer only if the AC power plug is inserted so that the chassis is connected to the ground side of the AC power source. To confirm that the AC power plug is inserted correctly, with an AC voltmeter, measure between the chassis and a known earth ground. If a voltage reading in excess of 1.0V is obtained, *remove and reinsert the AC power plug in the opposite polarity and again measure the voltage potential between the chassis and a known earth ground.
   b. Some TV receiver chassis have a circuit which obtain voltage about 70% of AC voltage between chassis and earth ground regardless of the AC plug polarity. This chassis can be safety-serviced only with an isolation transformer inserted in the power line between the receiver and the AC power source, for both personnel and test equipment protection.
   c. Some TV receiver chassis have a secondary ground system in addition to the main chassis ground. This secondary ground system is not isolated from the AC power line. The two ground systems are electrically separated by insulation material that must not be defeated or altered.
   Note: * In case unit has no polarity AC plug only.

6. Observe original lead dress. Take extra care to assure correct lead dress in the following areas: a. near sharp edges, b. near thermally hot parts-be sure that leads and components do not touch thermally hot parts, c. the AC supply, d. high voltage, and e. antenna wiring. Always inspect in all areas for pinched, out of place, or frayed wiring. Check AC power cord for damage.

7. Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.

8. **Product Safety Notice -** Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual

inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc.. Parts that have special safety characteristics are identified by a (⚠) on schematics and in parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. The Product's Safety is under review continuously and new instructions are issued whenever appropriate. Prior to shipment from the factory, our products are strictly inspected to confirm with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

Precautions during Servicing

A. Parts identified by the (⚠) symbol are critical for safety.
Replace only with part number specified.

B. In addition to safety, other parts and assemblies are specified for conformance with regulations applying to spurious radiation. These must also be replaced only with specified replacements.
Examples: RF converters, RF cables, noise blocking capacitors, and noise blocking filters, etc.

C. Use specified internal wiring. Note especially:
1) Wires covered with PVC tubing
2) Double insulated wires
3) High voltage leads

D. Use specified insulating materials for hazardous live parts. Note especially:
1) Insulation Tape
2) PVC tubing
3) Spacers
4) Insulators for transistors.

E. When replacing AC primary side components (transformers, power cord, etc.), wrap ends of wires securely about the terminals before soldering.

F. Observe that the wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

G. Check that replaced wires do not contact sharp edged or pointed parts.

H. When a power cord has been replaced, check that 10-15 kg of force in any direction will not loosen it.

I. Also check areas surrounding repaired locations.

J. Use care that foreign objects (screws, solder droplets. etc.) do not remain inside the set.

K. Crimp type wire connector
When replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, in order to prevent shock hazards, perform carefully and precisely the following steps.
Replacement procedure
1) Remove the old connector by cutting the wires at a point close to the connector.
Important: Do not re-use a connector (discard it).
2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.
3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.
4) Use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

L. When connecting or disconnecting the VCR connectors, first, disconnect the AC plug from AC supply socket.

Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

1. Clearance Distance

When replacing primary circuit components, confirm specified clearance distance (d) and (d') between soldered terminals, and between terminals and surrounding metallic parts. (See Fig. 1)

Table 1 : Ratings for selected area

AC Line Voltage	Region	Clearance Distance (d) (d')
200 to 240 V	Europe Australia	≥ 4mm (d) ≥ 6mm (d')

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

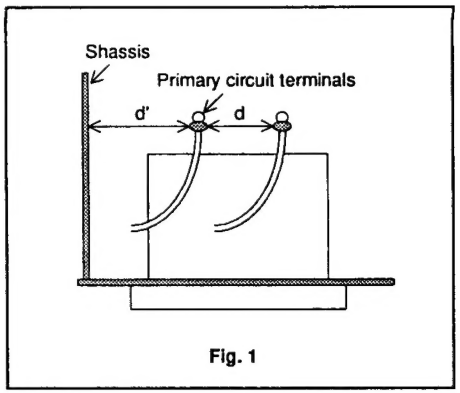


Fig. 1

2. Leakage Current Test

Confirm specified (or lower) leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

Measuring Method : (Power ON)

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See Fig. 2 and following table.

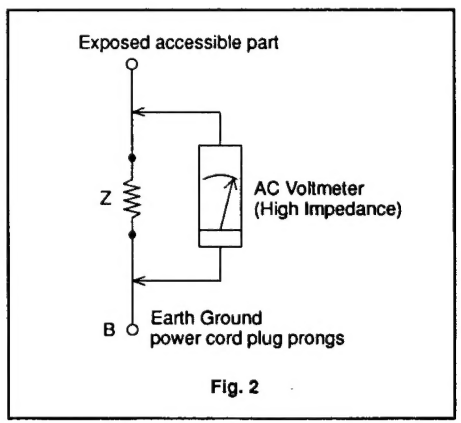


Fig. 2

Table 2 : Leakage current ratings for selected areas

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (B) to:
200 to 240 V	Europe Australia	2kΩ RES. in connected	i≤0.7mA rms i≤2mA dc	Antenna terminals
		50kΩ RES. in connected	i≤0.7mA rms i≤2mA dc	Other terminals

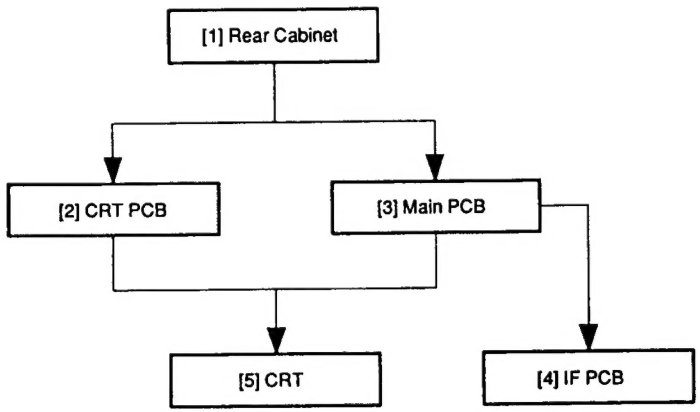
Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

DISASSEMBLY INSTRUCTIONS

1. DISASSEMBLY FLOW CHART

This flow chart indicates the disassembly steps of the cabinet parts and PCB in order to gain access to item(s) to be serviced. When reassembling, perform the step(s) in the reverse order. Bend, route and dress the cables as they were originally.

CAUTION ! : When removing the CRT, make sure to discharge Anode Lead of the CRT.
Use the CRT Ground Wire to discharge the CRT before removing the Anode Cap.



2. DISASSEMBLY METHOD

STEP / LOC. NO.	PART	REMOVAL		
		FIG. NO.	REMOVE / *UNLOCK / RELEASE / UNPLUG / UNCLAMP / DESOLDER	NOTE
[1]	Rear Cabinet	CAB1 CAB2	L2 (4pcs), L3	1
[2]	CRT PCB	CAB4 CAB5	CN602, CN603, CN604 FOCUS WIRE, SCREEN WIRE	2
[3]	Main PCB	CAB3 CAB5	CN201, CN202, CN203, CN204, CN208, CN501 ANODE CAP, FOCUS WIRE, SCREEN WIRE	3
[4]	IF PCB	CAB3	CN101, CN102	4
[5]	CRT	CAB4	B2 (4pcs)	5

Reference <Notes> in Table

1. (1) Remove 5 screws (L2, L3) and slide the Rear Cabinet backward.

2. (1) If not already removed, first remove the Rear Cabinet.
   (2) Remove all relative wires, then pull the CRT PCB backward.

3. (1) If not already removed, first remove the Rear Cabinet.
   (2) Remove all relative wires on the Main PCB and remove the Anode Cap, then slide the main PCB backward.

4. (1) If not already removed, first remove the Rear Cabinet.
   (2) Desolder CN101 and CN102, then remove the IF PCB from the Main PCB.

Caution !
Discharge Anode Lead of the CRT with the CRT Ground Wire before removing the Anode Cap.

5. (1) If not already removed, first remove the Rear Cabinet and Main PCB.
   (2) Remove 4 screws (B2), then the CRT can be removed.

[1] Rear Cabinet

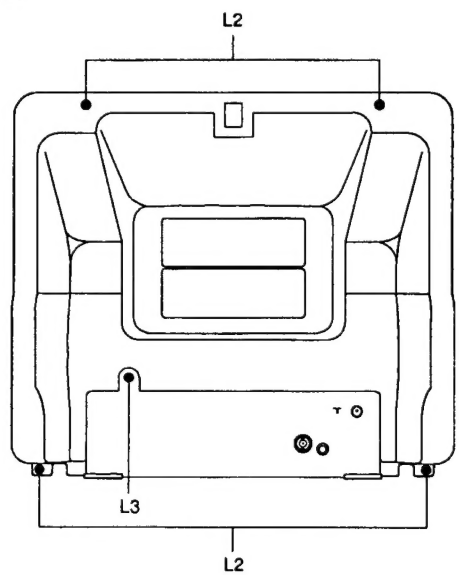


Fig. CAB 1

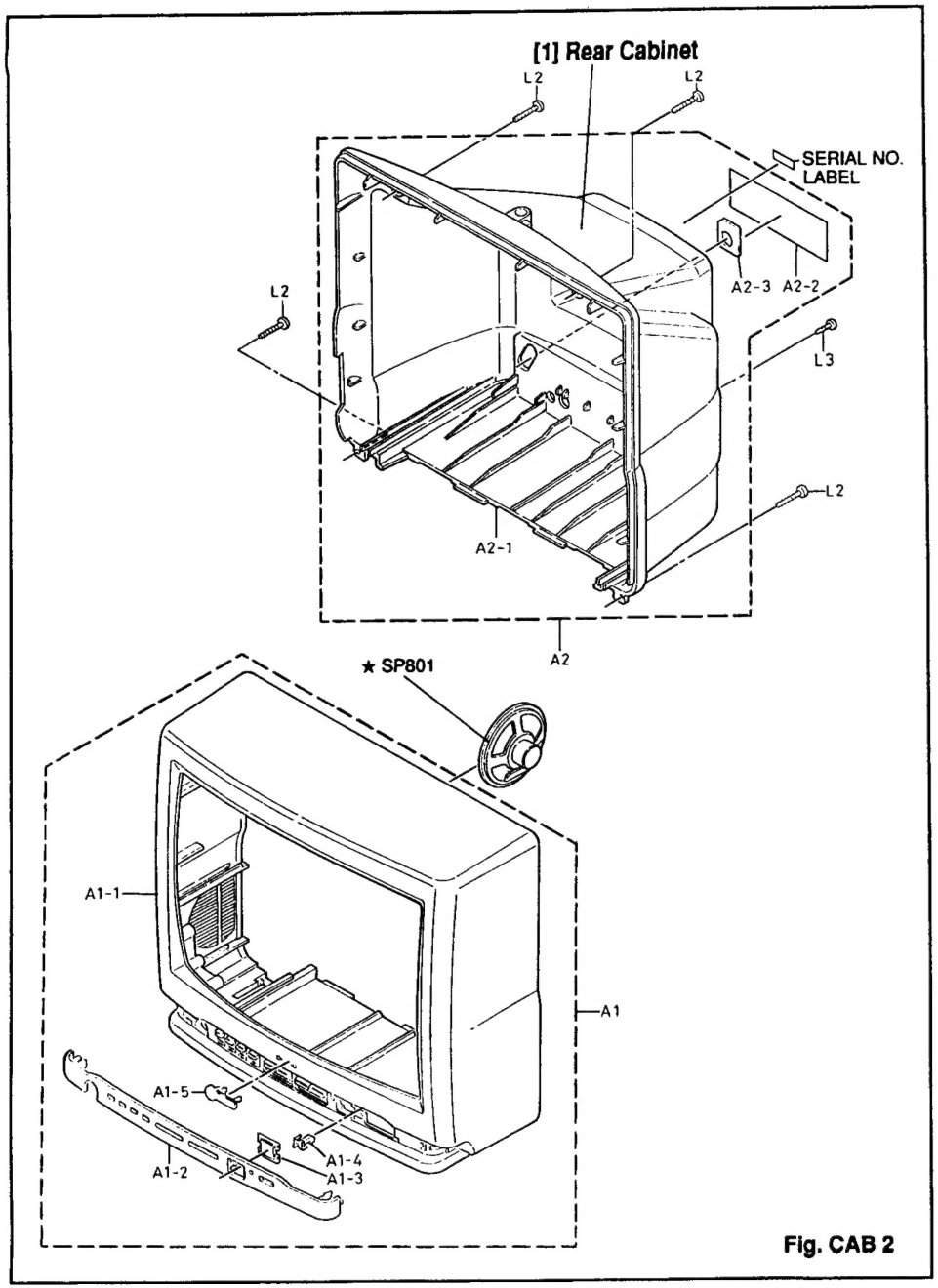


Fig. CAB 2

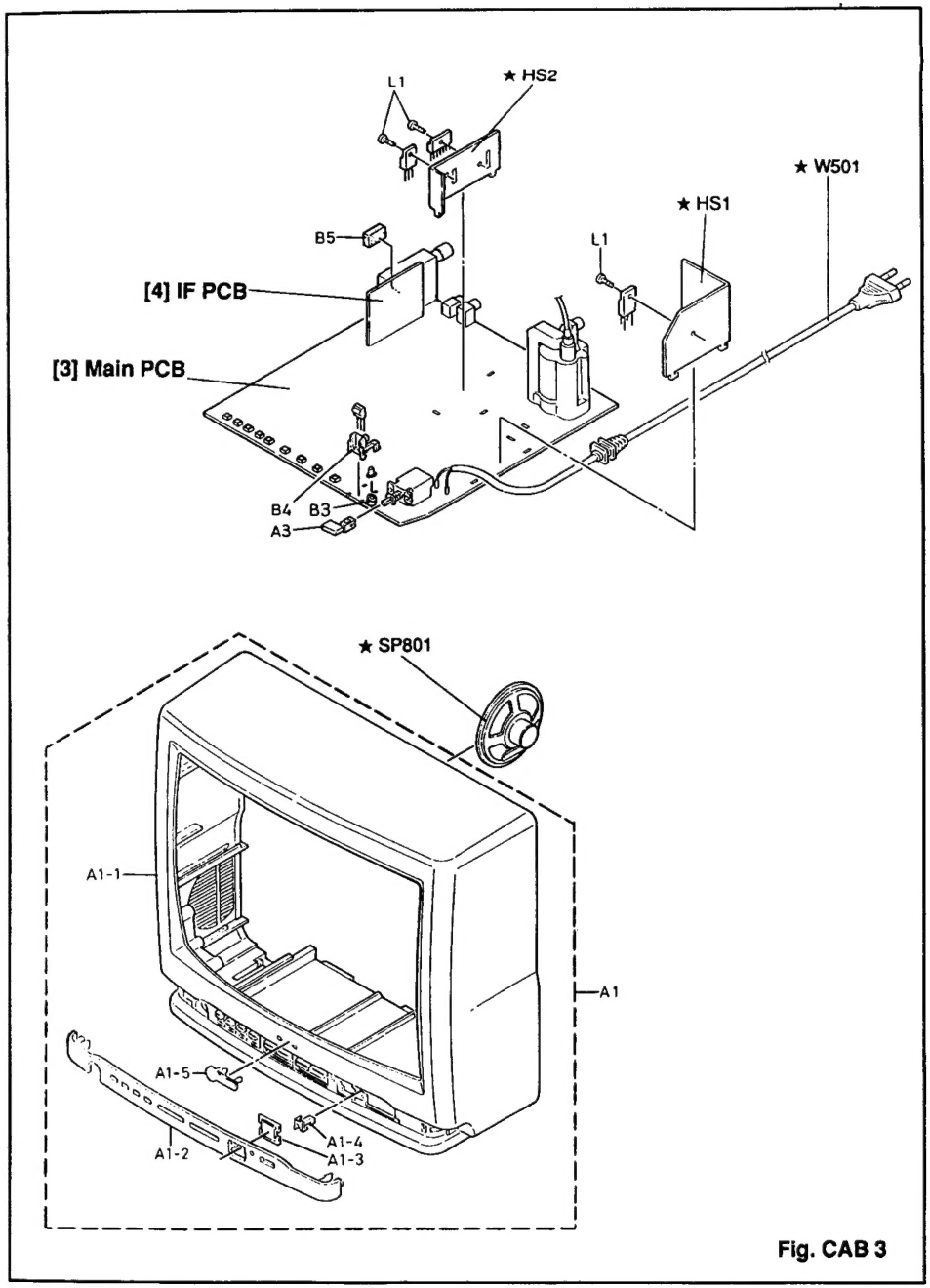


Fig. CAB 3

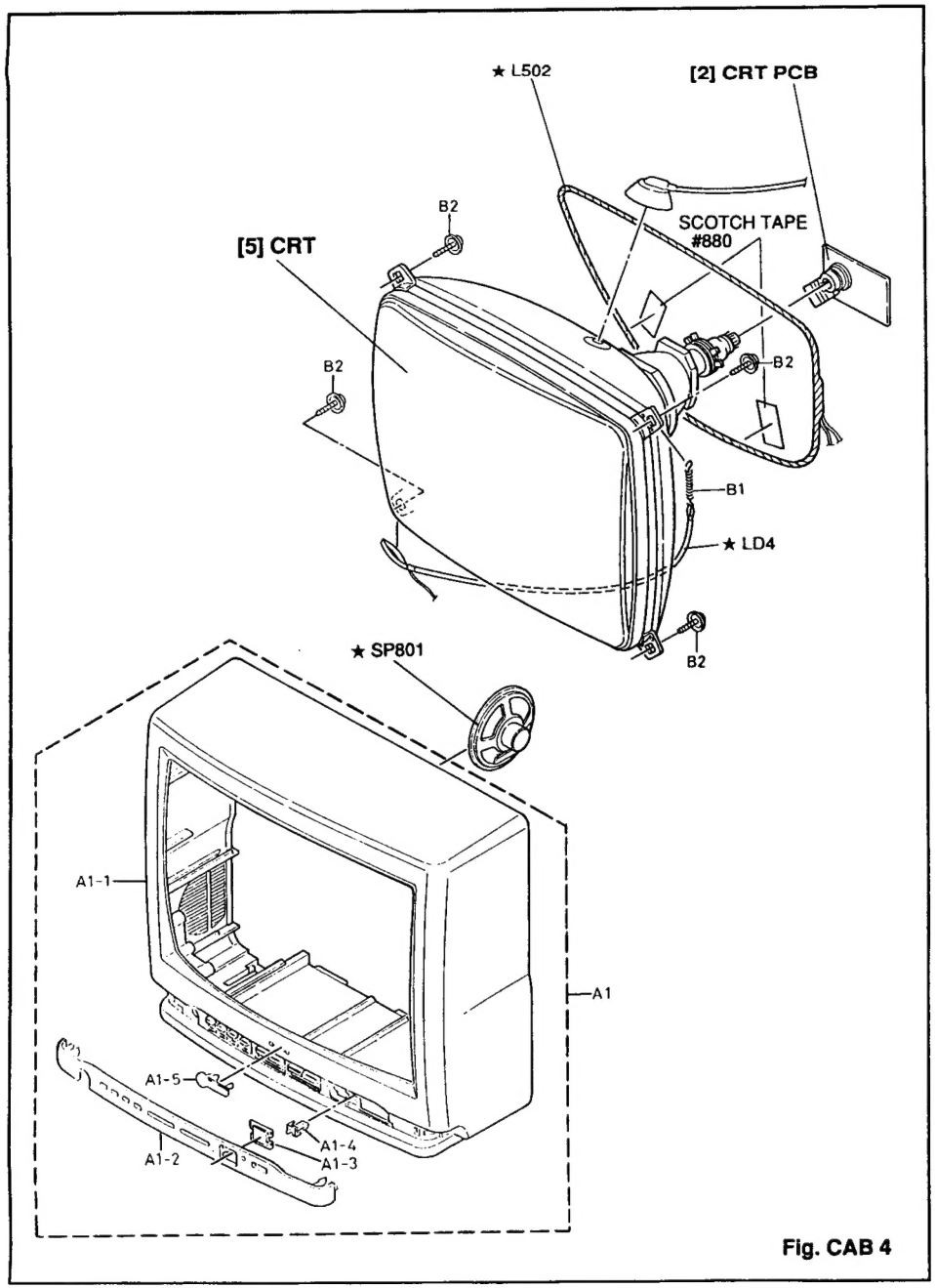


Fig. CAB 4

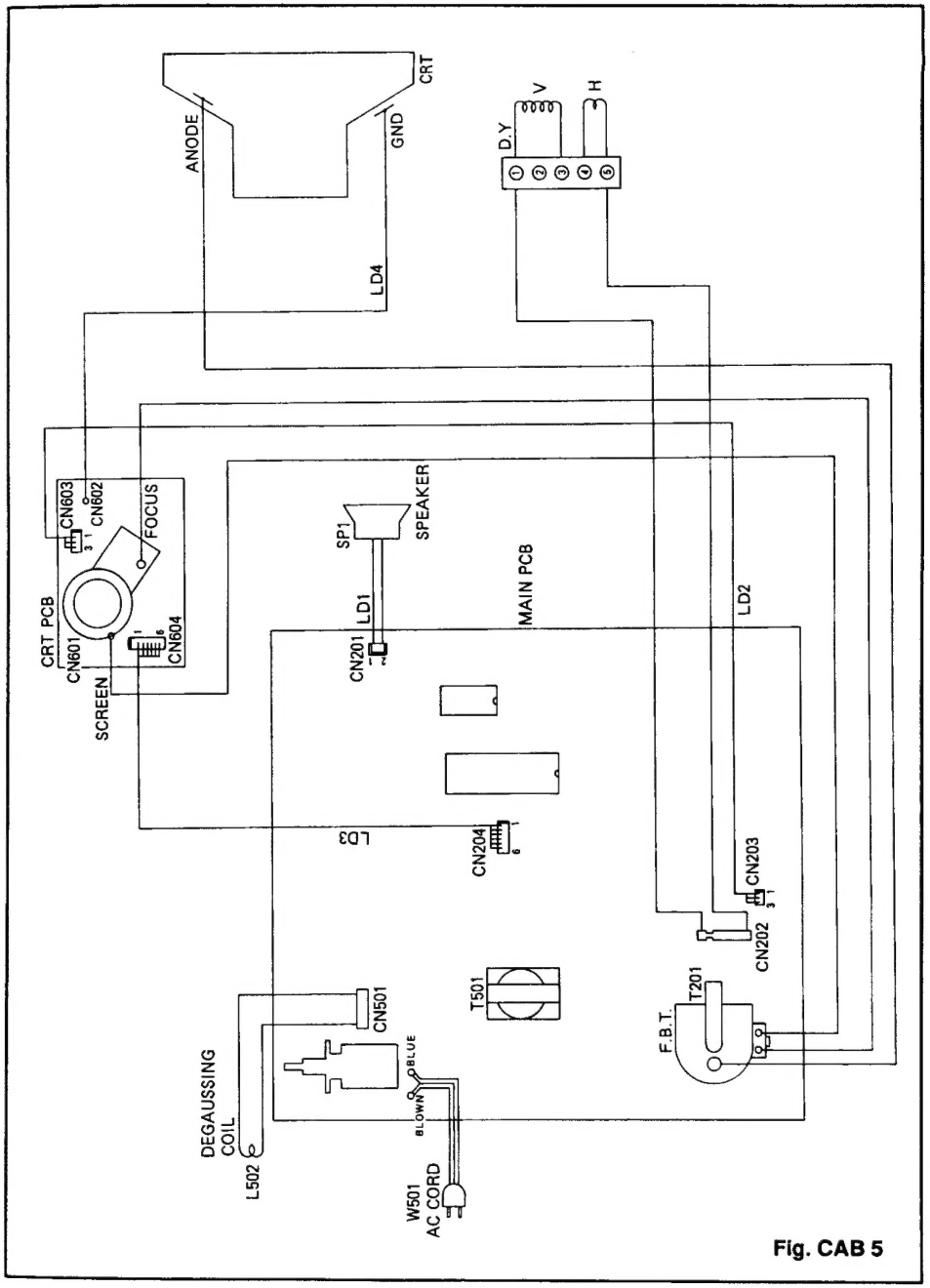


Fig. CAB 5

ELECTRICAL ADJUSTMENT INSTRUCTIONS

NOTE:

Electrical adjustments are required after replacing circuit components. It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

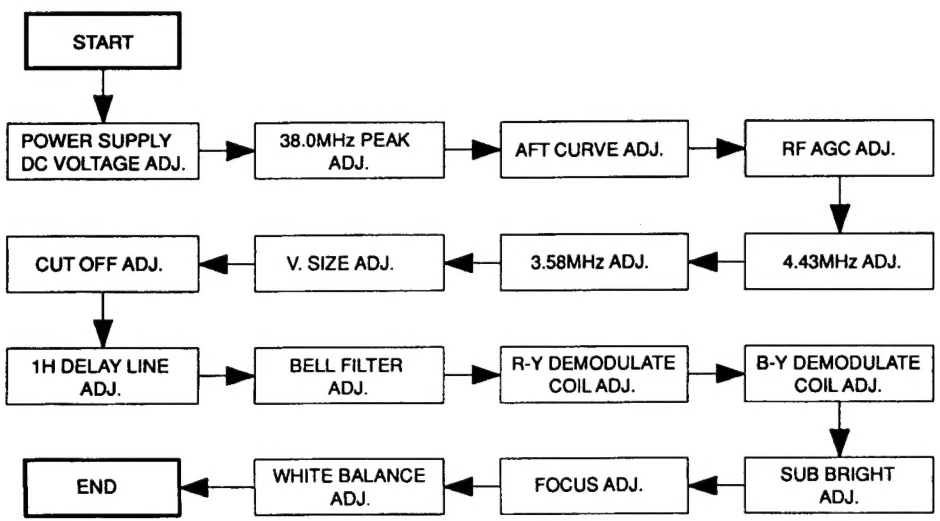
TEST EQUIPMENT REQUIRED:

1. IF Sweeper
2. DC Volt Meter
3. Oscilloscope: Dual Trace with 10:1 probe
4. PAL, SECAM and NTSC Pattern Generator
5. Monoscope
6. Color Analyzer

HOW TO SET UP THE ADJUSTMENT MODE:

Preset Mode: Press picture select button on the remote control unit, then press the number "1" button.

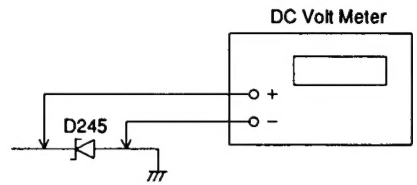
Brightness --------- Center
Color ---------- Center
Contrast ---------- Approx 70%



1. POWER SUPPLY DC VOLTAGE ADJUSTMENT

Purpose: To get correct voltage.
Symptom of Misadjustment: If voltage is incorrect, picture is dark.

Test Point	Adjustment Point	Input
D245	VR205	---
Equipment		Spec.
DC Volt Meter		DC +114±0.5V
Connections of M. EQ.		



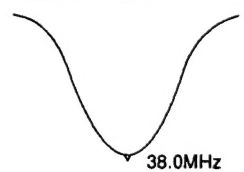
Reference Notes: D245, VR205 --- MAIN PCB

1. To inactivate FBT, ground the base of Q220.
2. Connect both terminal of C343 by 1KΩ (60W~80W).
3. Connect the equipment as shown in the above table.
4. Adjust VR205 for reading +114±0.5V on the DC Volt Meter.

2. 38.0MHz PEAK ADJUSTMENT (for TUNER)

Purpose: To adjust PIF (Picture Intermediate Frequency).
Symptom of Misadjustment: Beat may appear on the picture and buzz may sound.

Test Point	Adjustment Point	Input
IC101 6pin, 16pin	L106	---
Equipment		Spec.
IF Sweeper, Oscilloscope		See below
Figure		



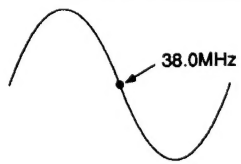
Reference Notes: IC101, L106 --- IF PCB

1. Connect Output of sweeper to 6pin of IC101.
   Frequency set of sweeper are below:
   (1) 31.5MHz (2) 32.4MHz (3) 33.57MHz (4) 35.8MHz (5) 38.0MHz (6) 39.45MHz
2. Connect the oscilloscope to 16pin of IC101.
3. Load DC Voltage to 4pin of IC101 as the wave of oscilloscope not to clip.
4. Adjust L106 as the marker for 38.0MHz to be peak.

3. AFT CURVE ADJUSTMENT (for TUNER)

Purpose: To operate AFT correctly.
Symptom of Misadjustment: AFT does not work correctly and/or synchronism will be faulty.

Test Point	Adjustment Point	Input
IC101 6pin, 11pin	L107	---
Equipment		**Spec.**
IF Sweeper, Oscilloscope		See below
Figure		



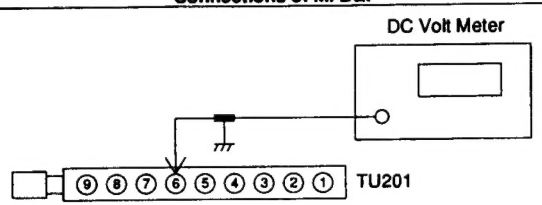
Reference Notes: SW206 --- MAIN PCB IC101, L107 --- IF PCB

1. Connect output of sweeper to 6pin of IC101.
   Frequency set is the same as for 38.0MHz Peak Adjustment.
2. Connect the oscilloscope to 11pin of IC101.
3. Push SW206 to disengage AFT action.
4. Adjust L107 as the marker for 38.0MHz to the center of AFT curve.

4. RF AGC ADJUSTMENT (for TUNER)

Purpose: Set AGC (Auto Gain Control) Level.
Symptom of Misadjustment: AGC does not synchronize correctly when RF Input Level is weak and distortion may cause on the picture when it is strong.

Test Point	Adjustment Point	Input
TU201 6pin	VR101	PAL Color Bar
Equipment		**Spec.**
PAL Pattern Generator, DC Volt Meter		DC +4.1±0.1V
Connections of M. EQ.		



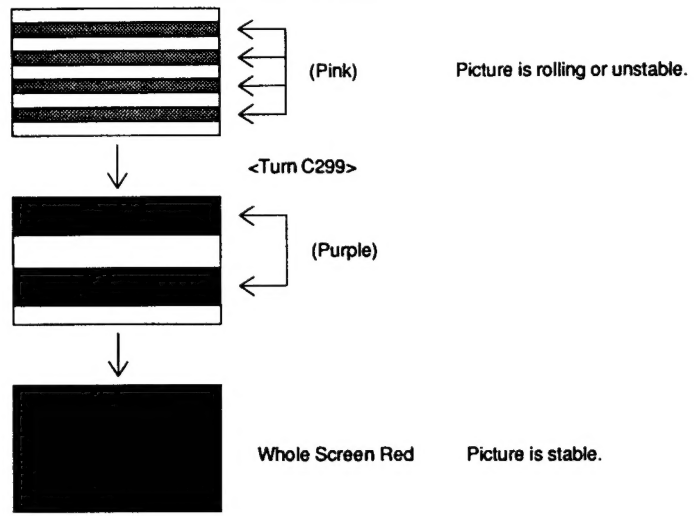
Reference Notes: TU201 --- MAIN PCB VR101 --- IF PCB

1. Receive the PAL Color Bar signal for 2ch (48.25MHz). (RF input level 80dBμV at the best syncronized point)
2. Connect the equipment as shown in the above table.
3. Adjust VR101 for reading +4.1±0.1V on the DC Volt Meter.

5. 4.43MHz ADJUSTMENT

Purpose: To adjust the color sub-carrier frequency of PAL and SECAM.
Symptom of Misadjustment: No color when receiving PAL and SECAM signal.

Test Point	Adjustment Point	Input
Screen	C299	PAL Red Raster
Equipment		**Spec.**
PAL Pattern Generator		See below
Figure		



Reference Notes: C299 --- MAIN PCB

1. Input the PAL Red Raster.
2. Check picture. A. If Red picture is stable. .....OK
   B. If Red picture is rolling or unstable, adjust C299 untill stable.

6. 3.58MHz ADJUSTMENT

Purpose: To adjust the color sub-carrier frequency of NTSC.
Symptom of Misadjustment: No color when receiving NTSC signal.

Test Point	Adjustment Point	Input
Screen	C298	NTSC Red Raster
Equipment		**Spec.**
NTSC Pattern Generator		See below

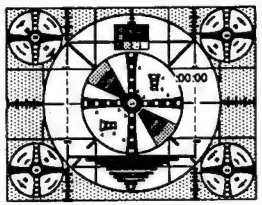
Reference Notes: C298 --- MAIN PCB

1. Input the NTSC Red Raster.
2. Check picture. Procedure is the same as for 4.43MHz Adjustment.

7. V. SIZE ADJUSTMENT

Purpose: *To get correct vertical size of screen image.*
Symptom of Misadjustment: Vertical size of screen image may not be properly displayed.

Test Point	Adjustment Point	Input
Screen	VR204	Monoscopic Pattern
Equipment		**Spec.**
Monoscope		90±5%
Figure		



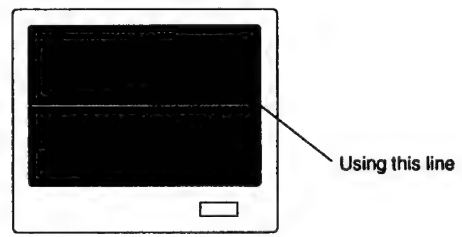
Reference Note: VR204 --- MAIN PCB

1. Operate the unit more than 20 minutes.
2. Input the Monoscopic Pattern.
3. Adjust VR204 so that the vertical size will be 90±5% of Monoscopic Pattern and the circle is round.

8. CUT OFF ADJUSTMENT

Purpose: To adjust the beam current of R, G, B and screen voltage.
Symptom of Misadjustment: White color may be reddish, greenish or bluish.
When the screen voltage is too high, the scanning line is appeared on the screen.

Test Point	Adjustment Point	Input
Screen	VR604, VR605, VR606 Screen-VR (FBT)	Black Raster
Equipment		**Spec.**
Pattern Generator		See below
Figure		



Reference Notes: VR601, VR602, VR603, VR604, VR605, VR606 --- CRT PCB
SW209 --- MAIN PCB
Screen-VR --- MAIN PCB (FBT)

1. Operate the unit more than 20 minutes.
2. Degauss the CRT using Degaussing Coil.
3. Input the Black Raster.
4. Turn the Screen-VR (FBT) fully counterclockwise.
5. Set VR602 (B. Drive), VR603 (R. Drive), VR604 (B. Cut Off), VR605 (G. Cut Off), VR606 (R. Cut Off) and VR601 (Sub Bright) to center.
6. Set the SW209 (Service SW) to ON.
7. Slowly turn the Screen-VR (FBT) to the point where horizontal line just visible.
8. Adjust VR604 (Blue), VR605 (Green) and VR606 (Red) so that horizontal line becomes pure white.
9. Turn off the SW209 (Service SW).

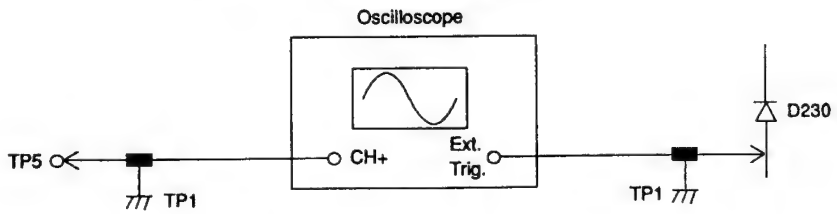
Note: Confirm that White Balance Adj. is correct after this adjustment, and attempt White Balance Adj. if needed.

9. 1 H DELAY LINE ADJUSTMENT (for PAL)

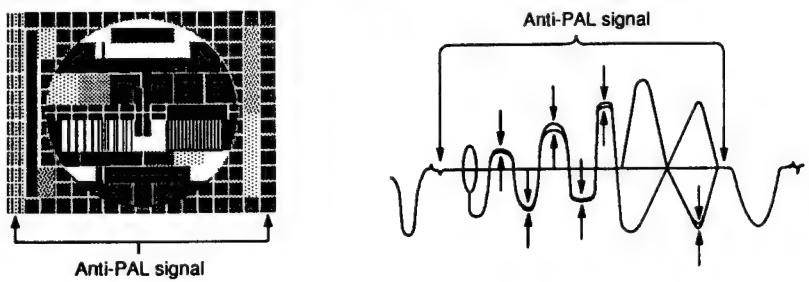
Purpose: *To get correct 1H delay line when the PAL signal is entered.*
Symptom of Misadjustment: The Anti-PAL signal part is colored when the Philips Pattern is entered.
Each scanning line is colored on the color bar.

Test Point	Adjustment Point	Input
TP5 TP1 (GND)	L210, VR202, VR203	Philips Pattern
Equipment		Spec.
Pattern Generator Oscilloscope		See below

Connections of M. EQ.



Figure



Reference Notes: D230, TP1, TP5, L210, VR202, VR203 --- MAIN PCB

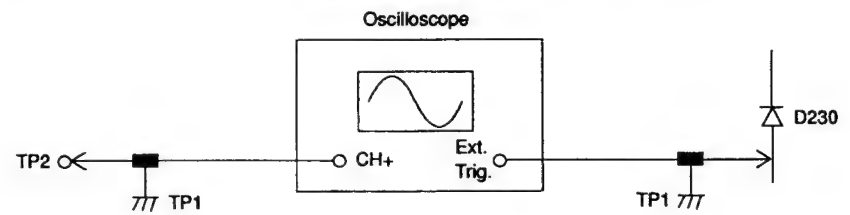
1. Input the Philips Pattern.
2. Connect the equipment as shown in the above table.
3. Adjust VR202 VR203 and L210 so that the amplitude at Anti-PAL signal part becomes minimum (no color) and the waveform at the color bar part is not seen in double ("Venetian Blind" does not appear at the color bar signal part).

10. BELL FILTER ADJUSTMENT (for SECAM)

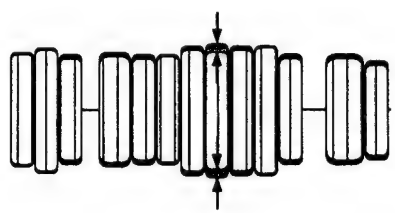
Purpose: To adjust the center frequency of SECAM bell filter.
Symptom of Misadjustment: The color will be reversed when the SECAM signal is entered.

Test Point	Adjustment Point	Input
TP2 TP1 (GND)	L216	SECAM Color Bar
Equipment		**Spec.**
SECAM Pattern Generator Oscilloscope (5mV/div, 10µs/div AC)		See below

Connections of M. EQ.



Figure



Reference Notes: D230, TP1, TP2, L216 --- MAIN PCB

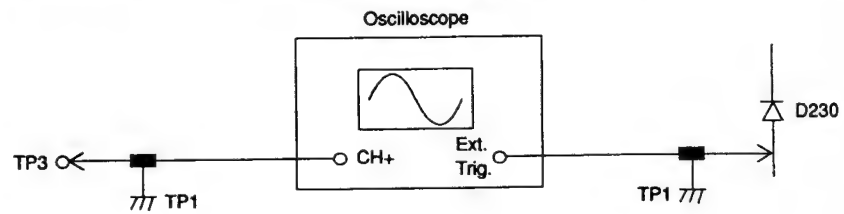
1. Input the SECAM Color Bar signal.
   The Contrast, Bright and Color control to center.
2. Connect the equipment as shown in the above table.
3. Set oscilloscope to 10 : 1 probe, AC 5mV/div and Range 10µs/div.
4. Adjust L216 with core driver to flat waveform.

11. R-Y DEMODULATE COIL ADJUSTMENT (for SECAM)

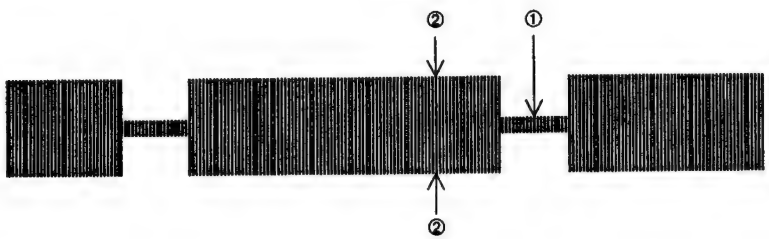
Purpose: *To adjust the level of R-Y color difference signal.*
Symptom of Misadjustment: The R, G and B will be unbalanced.

Test Point	Adjustment Point	Input
TP3 TP1 (GND)	L212	SECAM Black Raster
Equipment		**Spec.**
SECAM Pattern Generator Oscilloscope (20mV/div, 5μs/div AC)		See below

Connections of M. EQ.



Figure



Reference Notes: D230, TP1, TP3, L212 --- MAIN PCB

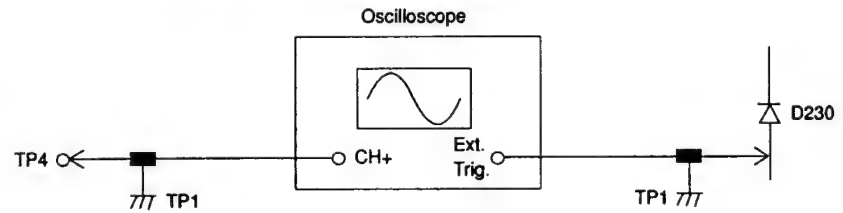
1. Connect the equipment as shown in the above table.
2. Input the SECAM Black Raster.
3. Adjust L212 with core driver so that ① becomes center of ② as shown in the above table.

12. B-Y DEMODULATE COIL ADJUSTMENT (for SECAM)

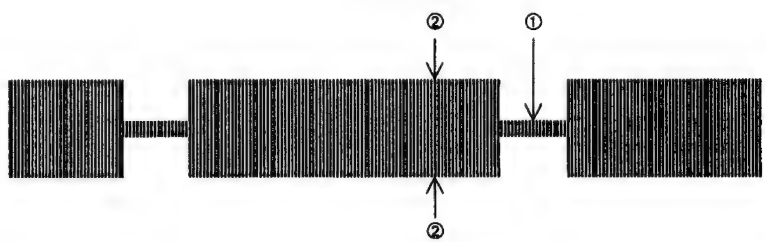
Purpose: To adjust the level of B-Y color difference signal.
Symptom of Misadjustment: The R, G and B will be unbalanced.

Test Point	Adjustment Point	Input
TP4 TP1 (GND)	L211	SECAM Black Raster
Equipment		**Spec.**
SECAM Pattern Generator Oscilloscope (20mV/div, 5μs/div AC)		See below

Connections of M. EQ.



Figure



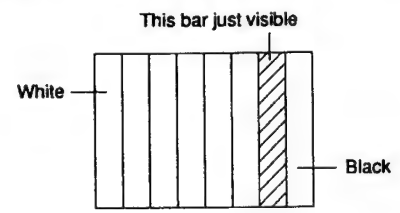
Reference Notes: D230, TP1, TP4, L211 --- MAIN PCB

1. Connect the equipment as shown in the above table.
2. Input the SECAM Black Raster.
3. Adjust L211 with core driver so that ① becomes center of ② as shown in the above table.

13. SUB BRIGHT ADJUSTMENT

Purpose: To get proper brightness.
Symptom of Misadjustment: Proper brightness cannot be obtained by adjusting the Bright Control.

Test Point	Adjustment Point	Input
Screen	VR601	Gray Scale pattern
Equipment		Spec.
Pattern Generator		See below
Figure		

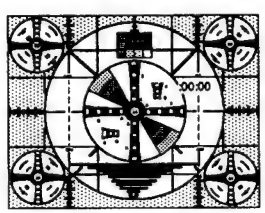


Reference Notes: VR601 --- CRT PCB
1. Operate the unit more than 20 minutes.
2. Input the 8-step Gray Scale pattern.
3. Adjust VR601 so that the bar is just visible. (See above figure)

14. FOCUS ADJUSTMENT

Purpose: To get correct focus.
Symptom of Misadjustment: Blurred image is shown on the display.

Test Point	Adjustment Point	Input
Screen	Focus-VR (FBT)	Monoscopic Pattern
Equipment		Spec.
Monoscope		See below
Figure		



Reference Note: Focus-VR (FBT) --- MAIN PCB
1. Operate the unit more than 20 minutes.
2. Input the Monoscopic Pattern.
3. Adjust Focus-VR (FBT) to be obtained clear picture.

SCHEMATIC DIAGRAMS / PCB'S AND TEST POINTS

STANDARD NOTES

Warning

Critical components having special safety characteristics are identified with a ⚠ by the Ref. No. in the parts list and enclosed within a broken line * (where several critical components are grouped in one area) along with the safety symbol ⚠ on the schematics or exploded views.
Use of substitute replacement parts which do not have the same specified safety characreristics may create shock, fire, or other hazards.
Under no circumstances should the original design be modified or altered without written permission from Funai Electric Company. Funai assumes no liability, express or implied, arising out of any unauthorized modification of design. Servicer assumes all liability.

Notes:

① Do not use the part number shown on these drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since these drawings were prepared.
② All resistance values are indicated in ohms ($K=10^3$, $M=10^6$).
③ Resistor wattages are 1/5W or 1/6W unless otherwise specified.
④ All capacitance values are indicated in μF ($P=10^{-6}\mu F$).

Note of Capacitors:

Ⓜ --- Mylar Cap. (SC) --- Semiconductor Cap. (TF) --- Stacked Metallized Film Cap.

Temprature Characteristics of Capacitors are noted with the following:

(YB) --- ±10% (SR) --- ±15% (NP0) --- 0±60ppm/°C (SL) --- +350~-1000ppm/°C

Tolerance of Capacitors are noted with the following:

(K) --- ±10% (Z) --- +80~-20%

Note of Resistor:

Ⓕ --- Fuse Res.

VOLTAGE CHART

(Unit: Volt)

Pin No.	IC101	IC201	IC206
1	5.7	4.6	2.8
2	4.7	3.5	4.3
3	5.4	2.6	5.8
4	3.9	2.0	4.6
5	3.9	* 5.0~0.1	5.8
6	4.3	0	5.8
7	4.3	5.0	6.6
8	0	0	4.4
9	1.4	2.4	NC
10	4.8	2.5	4.4
11	6.0	2.5	0
12	3.8	5.0	0
13	8.4	5.0	0
14	8.4	5.0	0
15	3.8	5.0	3.1
16	4.4	5.0	5.0
17	11.7	0	2.9
18	0	NC	0.9
19	3.0	5.0	8.9
20	3.0	3.5	0.2
21		0	4.8
22		NC	0
23		0	0
24		0	2.2
25		0	9.0
26		4.1	3.6
27		5.0	0.5
28		3.0	0
29		3.0	4.2
30		0	5.2
31		—	3.0
32		—	0.6
33		4.9	0.4
34		0	6.1
35		5.0	6.1
36		4.5	5.8
37		0	2.5
38		5.0	2.6
39		0	2.5
40		0	3.9
41		0	4.8
42		5.0	6.8
43			2.6
44			3.3
45			3.6
46			6.3
47			8.9
48			0

Pin No.	IC202	IC203	IC204	IC205
1	5.0	6.0	0	11.0
2	2.5	5.9	13.0	4.9
3	2.5	6.9	27.4	NC
4	5.0	6.9	0.8	* 0.7~11.3
5	0	7.0	0.7	7.2
6	5.0	0	27.0	7.4
7	5.0	0	1.7	0
8	5.0	0		7.5
9		11.7		15.5
10		11.7		
11		11.7		
12		4.6		
13		5.0		
14		5.0		
15		6.0		
16		11.7		

Pin No.	IC207	IC208	IC209	IC210
1	16.3	32.0	2.5	11.8
2	0	0	2.5	0
3	11.8		4.9	8.9
4			4.9	
5			1.7	
6			1.7	
7			2.5	
8			2.6	
9			3.3	
10			2.7	
11			2.7	
12			1.7	
13			0.2	
14			0	
15			2.2	
16			3.8	
17			2.3	
18			1.7	
19			4.9	
20			4.9	
21			2.5	
22			2.5	
23			0	
24			2.5	

* Vol. Min~Max

Input: PAL Color Bar Signal (with 1KHz Audio Signal)
Receiving Ch.: E2 ch (48.25 MHz)
Preset Mode: Press Picture Select button on the remote control unit, then press the number "1" button.
Brightness--- Center
Color--- Center
Contrast--- Approx 70%

Unit: Volt)

IC205
11.0
4.9
NC
0.7~11.3
7.2
7.4
0
7.5
15.5

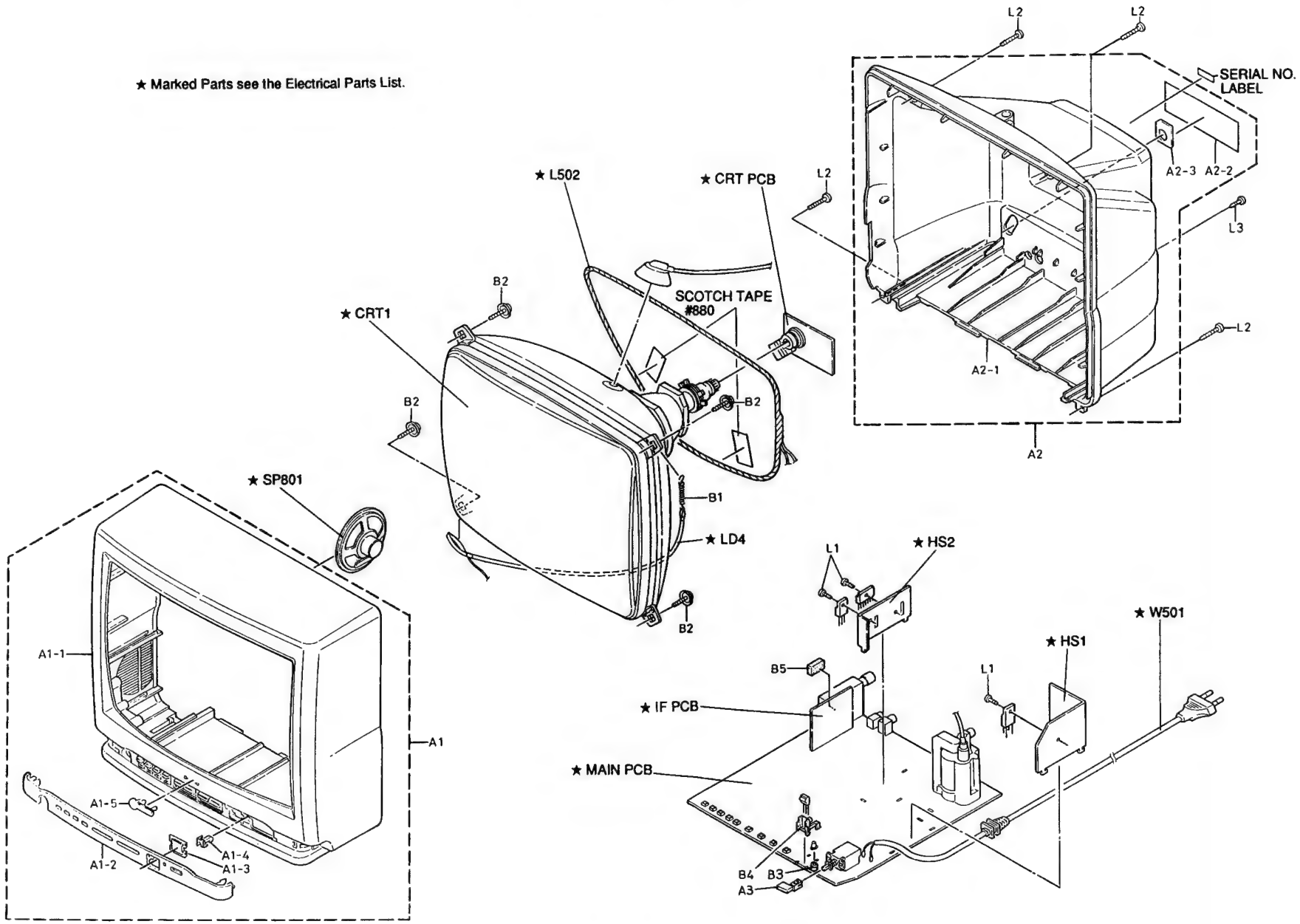
IC210
11.8
0
8.9

Signal)

te control unit,

EXPLODED VIEW

★ Marked Parts see the Electrical Parts List.



MECHANICAL PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

Ref. No.	Description	Part No.
A 1	FRONT CABINET ASS'Y	0EM300556
A1-1 *	FRONT CABINET	0EM000113
A1-2	CONTROL PANEL	0EM200264
A1-3	SENSOR WINDOW	0EM401486
A1-4	LED INDICATOR	0EM401470
A1-5	BRAND BADGE	0EM400975
A 2	REAR CABINET ASS'Y	0EM300557
A2-1	REAR CABINET	0EM000114
A2-2 ⚠	RATING LABEL	0EM401495
A2-3	JACK PLATE	0EM401488
A 3	(See Electrical Parts List)	
B 1	TENSION SPRING	26WH006
B 2	CRT MOUNTING SCREW	8A00083
B 3	(See Electrical Parts List)	
B 4	(See Electrical Parts List)	
B 5	(See Electrical Parts List)	
L 1	(See Electrical Parts List)	
L 2	SCREW P-TIGHT BIND HEAD 4X18	GBMP4180
L 3	SCREW P-TIGHT BIND HEAD 4X12	GBMP4120
	ACCESSORIES	
	REMOTE CONTROL UNIT	UREMT20MM007
	DRY BATTERY UM-3(K) 2PCS PACK or	1813020
	DRY BATTERY UM3/RS6 2PCS PACK	579W099
⚠	OWNER'S MANUAL	0EMN00641
	ROD ANTENNA	0EMN00542

* Material certificate is required to attach.

ELECTRICAL PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

NOTE: Parts that not assigned part number (----------) are not available.

Tolerance of Capacitors and Resistors are noted with the following symbols.

C.....±0.25% F.....±1% J.....±5% M.....±20% Z.....+80/-20%
D.....±0.5% G.....±2% K.....±10% N.....±30%

MMA PCB ASSEMBLY

Ref. No.	Description	Part No.
	MMA PCB ASSEMBLY Consists of the following:	0ESA00337
⚠	PCB (MAIN+CRT+IF)	BL7401F010B1
	MAIN PCB (MMA-A)	———
	CRT PCB (MMA-B)	———
	IF PCB (MMA-C)	———

MAIN PCB (MMA-A)

Ref. No.	Description	Part No.
	MAIN PCB (MMA-A) Consists of the following:	———
	CAPACITORS	
C 202	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 203	ELECTROLYTIC CAP. 4.7µF/50V M	126F475S
C 209	ELECTROLYTIC CAP. 4.7µF/50V M	126F475S
C 211	ELECTROLYTIC CAP. 4.7µF/50V M	126F475S
C 212	ELECTROLYTIC CAP. 220µF/6.3V M	126A227S
C 213	ELECTROLYTIC CAP. 1µF/50V M	126F105S
C 214	CHIP CERAMIC CAP. F Z 0.022µF/50V	CHE1JZB0F223
C 215	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 216	*MYLAR CAP. 0.18µF/50V K	2250184S
C 217	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 218	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 219	ELECTROLYTIC CAP. 1µF/50V M	126F105S
C 220	CHIP CERAMIC CAP. SL J 120pF/50V	CHE1JBSL121
C 221	ELECTROLYTIC CAP. 2.2µF/50V M	126F225S
C 224	CHIP CERAMIC CAP. CH J 24pF/50V	CHE1JBCH240
C 225	CHIP CERAMIC CAP. CH J 24pF/50V	CHE1JBCH240
C 229	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 230	ELECTROLYTIC CAP. 47µF/16V M	126C476S
C 232	CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JBSL101
C 233	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 234	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 235	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 236	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 237	CHIP CERAMIC CAP. SL J 47pF/50V	CHE1JBSL470
C 238	MYLAR CAP. 0.001µF/50V K	2250102S
C 239	MYLAR CAP. 0.0022µF/50V K	2250222S
C 240	MYLAR CAP. 0.1µF/50V K	2250104S
C 241	CHIP CERAMIC CAP. B K 0.001µF/50V	CHE1JKB0B102
C 242	ELECTROLYTIC CAP. 100µF/35V M	126E107S
C 243	ELECTROLYTIC CAP. 22µF/35V M	126E226S
C 245	ELECTROLYTIC CAP. 2.2µF/50V M	126F225S
C 246	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 247	ELECTROLYTIC CAP. 470µF/25V M or	CE1EMZDDL471
	ELECTROLYTIC CAP. 470µF/25V M or	CE1EMZNTL471
	ELECTROLYTIC CAP. 470µF/25V M W/F	626D477
C 249	METALIZED FILM CAP. 0.39µF/200V J or	122Z180
	METALIZED FILM CAP. 0.39µF/200V J or	CBP2DKD00394
	METALIZED FILM CAP. 0.39µF/200V J	1220510
C 250	MYLAR CAP. 0.1µF/50V K	2250104S
C 251	ELECTROLYTIC CAP. 1µF/50V M	126F105S
C 252	CHIP CERAMIC CAP. B K 0.01µF/50V	CHE1JKB0B103
C 253	ELECTROLYTIC CAP. 2.2µF/50V M	126F225S
C 254	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 255	ELECTROLYTIC CAP. 10µF/50V M	126F106S
C 256	MYLAR CAP. 0.082µF/50V K	2250823S
C 257	ELECTROLYTIC CAP. 470µF/16V M or	CE1CMZDDL471
	ELECTROLYTIC CAP. 470µF/16V M or	CE1CMZNTL471
	ELECTROLYTIC CAP. 470µF/16V M	626C477
C 259	ELECTROLYTIC CAP. 470µF/25V M or	CE1EMZDDL471
	ELECTROLYTIC CAP. 470µF/25V M or	CE1EMZNTL471
	ELECTROLYTIC CAP. 470µF/25V M W/F	626D477
C 260	ELECTROLYTIC CAP. 1µF/250V M(105°C)	CA2E010NC009
C 261	ELECTROLYTIC CAP. 330µF/35V M or	CE1GMZDDL331
	ELECTROLYTIC CAP. 330µF/35V M or	CE1GMZNTL331
	ELECTROLYTIC CAP. 330µF/35V M W/F	626E337
C 262	ELECTROLYTIC CAP. 1µF/100V or	CE2AMADDL010
	ELECTROLYTIC CAP. 1µF/100V	CE2AMANTL010
C 263	METALIZED FILM CAP. 0.0047µF/1.6KV or	122Z183
	METALIZED FILM CAP. 0.0047µF/1.6KV J	1220496
C 264	METALIZED FILM CAP. 0.0027µF/1.6KV J or	122Z279
	METALIZED FILM CAP. 0.0027µF/1.6KV J	1220493
C 265	ELECTROLYTIC CAP. 0.47µF/160V or	CE2CMADDLR47
	ELECTROLYTIC CAP. 0.47µF/160V	CE2CMANTLR47
C 268	CERAMIC CAP. B K 2200pF/500V	CCD2JKS0B222
C 271	ELECTROLYTIC CAP. 47µF/160V M (105°C) or	CA2C470NC009
	ELECTROLYTIC CAP. 47µF/160V M	CE2CMZDEH470
C 273	ELECTROLYTIC CAP. 4.7µF/50V M	126F475S
C 276	ELECTROLYTIC CAP. 0.22µF/50V M	126F224S

* Mylar is a registered trademark of E. I. Du Pont de Nemours and Company.

Ref. No.	Description	Part No.
C 277	CHIP CERAMIC CAP. SL J 33pF/50V	CHE1JBSL330
C 278	ELECTROLYTIC CAP. 470μF/16V M or	CE1CMZDDL471
	ELECTROLYTIC CAP. 470μF/16V M or	CE1CMZNTL471
	ELECTROLYTIC CAP. 470μF/16V M	626C477
C 279	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 280	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 281	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 282	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 283	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 284	ELECTROLYTIC CAP. 4.7μF/50V M	126F475S
C 285	STACKED FILM CAP. 0.22μF/50V J or	125U224S
	STACKED FILM CAP. 0.22μF/50V J	125R224S
C 286	STACKED FILM CAP. 0.22μF/50V J or	125U224S
	STACKED FILM CAP. 0.22μF/50V J	125R224S
C 287	STACKED FILM CAP. 0.22μF/50V J or	125U224S
	STACKED FILM CAP. 0.22μF/50V J	125R224S
C 288	SEMICONDUCTOR CAP. SR K 0.047μF/25V	12Y2473S
C 289	CHIP CERAMIC CAP. B K 0.001μF/50V	CHE1JKB0B102
C 290	CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C 291	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 292	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C 293	ELECTROLYTIC CAP. 100μF/16V M	126C107S
C 294	FILM CAP. 0.47μF/50V J or	125U474S
	FILM CAP. 0.47μF/50V J	125R474S
C 295	STACKED FILM CAP. 0.15μF/50V J or	125U154S
	STACKED FILM CAP. 0.15μF/50V J	125R154S
C 296	ELECTROLYTIC CAP. 0.47μF/50V M	126F474S
C 297	CHIP CERAMIC CAP. B K 0.001μF/50V	CHE1JKB0B102
C 298	TRIMMER CAP. VCT51Fssss 30P	CVC300UT1008
C 299	TRIMMER CAP. VCT51Fssss 30P	CVC300UT1008
C 300	CHIP CERAMIC CAP. B K 0.0022μF/50V	CHE1JKB0B222
C 301	STACKED FILM CAP. 0.22μF/50V J or	125U224S
	STACKED FILM CAP. 0.22μF/50V J	125R224S
C 302	ELECTROLYTIC CAP. 22μF/50V M	126F226S
C 303	CHIP CERAMIC CAP. SL J 10pF/50V	CHE1JBSL100
C 304	CHIP CERAMIC CAP. SL J 82pF/50V	CHE1JBSL820
C 305	CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JBSL220
C 306	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C 307	CHIP CERAMIC CAP. SL J 75pF/50V	CHE1JBSL750
C 308	SEMICONDUCTOR CAP. F Z 0.1μF/25V	1220520S
C 309	CHIP CERAMIC CAP. SL J 27pF/50V	CHE1JBSL270
C 310	CHIP CERAMIC CAP. SL J 120pF/50V	CHE1JBSL121
C 311	ELECTROLYTIC CAP. 1μF/50V M	126F105S
C 313	CHIP CERAMIC CAP. B K 0.0056μF/50V	CHE1JKB0B562
C 314	CHIP CERAMIC CAP. SL J 220pF/50V	CHE1JBSL221
C 315	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C 316	CHIP CERAMIC CAP. SL J 100pF/50V	CHE1JBSL101
C 317	SEMICONDUCTOR CAP. F Z 0.1μF/25V	1220520S
C 318	CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JBSL220
C 319	CHIP CERAMIC CAP. SL J 75pF/50V	CHE1JBSL750
C 320	SEMICONDUCTOR CAP. F Z 0.1μF/25V	1220520S
C 321	CHIP CERAMIC CAP. SL J 120pF/50V	CHE1JBSL121
C 322	ELECTROLYTIC CAP. 47μF/16V M	126C476S
C 340	CERAMIC CAP. B K 470pF/500V	CCD2JKSSL471
C 341	CERAMIC CAP. B K 470pF/50V	12B3471S
C 342	CERAMIC CAP. B K 470pF/50V	12B3471S
C 343	ELECTROLYTIC CAP. 100μF/160V M(105°C) or	CA2C101NC009
	ELECTROLYTIC CAP. 100μF/160V M(105°C)	CE2CMZDEH101

Ref. No.	Description	Part No.
C 344	ELECTROLYTIC CAP. 1000μF/25V M or	CE1EMZDDL102
	ELECTROLYTIC CAP. 1000μF/25V M or	CE1EMZNTL102
	ELECTROLYTIC CAP. 1000μF/25V M W/F	626D108
C 345	ELECTROLYTIC CAP. 47μF/16V M	126C476S
C 346	ELECTROLYTIC CAP. 2200μF/25V M	CE1EMZNTL222
C 347	ELECTROLYTIC CAP. 470μF/16V M or	CE1CMZDDL471
	ELECTROLYTIC CAP. 470μF/16V M or	CE1CMZNTL471
	ELECTROLYTIC CAP. 470μF/16V M	626C477
C 348	ELECTROLYTIC CAP. 2.2μF/50V M	126F225S
C 363	ELECTROLYTIC CAP. 470μF/16V M or	CE1CMZDDL471
	ELECTROLYTIC CAP. 470μF/16V M or	CE1CMZNTL471
	ELECTROLYTIC CAP. 470μF/16V M	626C477
C 364	MYLAR CAP. 0.1μF/50V K	2250104S
C 365	CHIP CERAMIC CAP. F Z 0.022μF/50V	CHE1JZB0F223
C 366	MYLAR CAP. 0.0022μF/50V K	2250222S
C 368	CHIP CERAMIC CAP. B K 0.001μF/50V	CHE1JKB0B102
C 370	MYLAR CAP. 0.1μF/50V K	2250104S
C 372	CERAMIC CAP. CH D 10pF/50V	12CH100S
C 375	ELECTROLYTIC CAP. 47μF/16V M	126C476S
C 376	CERAMIC CAP. 1000pF/1KV or	CCD3AKP0E102
	CERAMIC CAP. 1000pF/1KV	6220574
C 377	CERAMIC CAP. CH J 47pF/50V	12CH470S
C 378	ELECTROLYTIC CAP. 1000μF/16V M W/F or	CE1CMZDDL102
	ELECTROLYTIC CAP. 1000μF/16V M or	CE1CMZNTL102
	ELECTROLYTIC CAP. 1000μF/16V M W/F	626C108
C 379	ELECTROLYTIC CAP. 470μF/16V M or	CE1CMZDDL471
	ELECTROLYTIC CAP. 470μF/16V M or	CE1CMZNTL471
	ELECTROLYTIC CAP. 470μF/16V M	626C477
C 501 ⚠	CERAMIC CAP./SAFETY E M 2200pF/AC125V or	CCG2HMP0E222
	CERAMIC CAP./SAFETY 0.0022μF	1220621
C 502 ⚠	CERAMIC CAP./SAFETY E M 2200pF/AC125V or	CCG2HMP0E222
	CERAMIC CAP./SAFETY 0.0022μF	1220621
C 503 ⚠	CERAMIC CAP./SAFETY E M 2200pF/AC125V or	CCG2HMP0E222
	CERAMIC CAP./SAFETY 0.0022μF	1220621
C 504 ⚠	CERAMIC CAP./SAFETY E M 2200pF/AC125V or	CCG2HMP0E222
	CERAMIC CAP./SAFETY 0.0022μF	1220621
C 505 ⚠	METALIZED FILM CAP. 0.1μF/250V or	1220971
	METALIZED FILM CAP. 0.1μF/250V or	122Z181
	LINE ACROSS CAP. 0.1μF/250V	6222631
C 506	ELECTROLYTIC CAP. 150μF/400V(LQ TYPE)	CA2H151NC013
C 507	MYLAR CAP. 0.039μF/50V K	2250393S
C 508	CERAMIC CAP. 680pF/2KV or	CCD3DKP0B681
	CERAMIC CAP. 680pF/2KV	6220584
C 509	MYLAR CAP. 0.022μF/50V K	2250223S
C 510	MYLAR CAP. 0.022μF/50V K	2250223S
C 512 ⚠	CERAMIC CAP. 2200pF/400V(T4KV) or	CCN2HMP0E222
	CERAMIC CAP. 0.0022μF/4KV	122Z011
C 513	CERAMIC CAP. 2200pF/1KV or	CCD3AKP0B222
	CERAMIC CAP. 2200pF/1KV	6220576
C 515	ELECTROLYTIC CAP. 330μF/25V M or	CE1EMZDDL331
	ELECTROLYTIC CAP. 330μF/25V M or	CE1EMZNTL331
	ELECTROLYTIC CAP. 330μF/25V M W/F	626D337
C 516	ELECTROLYTIC CAP. 220μF/6.3V M	126A227S
C 517	CERAMIC CAP. 2200pF/1KV or	CCD3AKP0B222
	CERAMIC CAP. 2200pF/1KV	6220576

Ref. No.	Description	Part No.
	CONNECTORS	
CN 201	STRAIGHT PIN HEADER	1740764
CN 202	PIN HEADER 5P (for D.Y) or	1730812
	PIN HEADER 5P (for D.Y)	1780168
CN 203	WIRE HOLDER 3P or	XW01D03NF001
	WIRE HOLDER 3P	XW01B03NF001
CN 204	WIRE HOLDER 6P or	XW01D06NF001
	WIRE HOLDER 6P	XW01B06NF001
CN 501	PIN HEADER 2P (for D.G COIL) or	1780276
	PIN HEADER 2P (for D.G COIL)	1780165
	DIODES	
D 202	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 204	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 207	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 211	ZENNER DIODE MTZ7.5B-T77 or	MTZ7.5BT
	ZENER DIODE GZS7.5Y-BT or	QDTY00GZS7R5
	ZENER DIODE UZ-7.5BSA	QDTA0UZ7R5BS
D 212	ZENNER DIODE MTZ7.5B-T77 or	MTZ7.5BT
	ZENER DIODE GZS7.5Y-BT or	QDTY00GZS7R5
	ZENER DIODE UZ-7.5BSA	QDTA0UZ7R5BS
D 213	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 214	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 215	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 216	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 217	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 218	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 221	LED SLR-55VC3F(RED) or	1401273
	LED KLR-133L	NP9Z0KLR133L
D 222	ZENNER DIODE MTZ5.1C or	MTZ5.1CT
	ZENER DIODE GZS5.1Z-BT or	QDTZ00GZS5R1
	ZENER DIODE UZ-5.1BSB	QDTB0UZ5R1BS
D 227	RECTIFIER DIODE ERA15-02KFRB	QDNZ0ERA1502
D 228	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 229	DIODE ERB12-02L3	AERB1202L300
D 230	FAST RECOVERY DIODE ERB44-04L3	QDQZ0ERB4404
D 231	DIODE 1SS130	1SS130T
D 232	ZENNER DIODE MTZ18BT or	MTZ18BT
	ZENNER DIODE GZS18Y-BT or	QDTY000GZS18
	ZENER DIODE UZ-18BSB	QDTB00UZ18BS
D 233	ZENNER DIODE MTZ12B or	MTZ12BT
	ZENNER DIODE GZS12Y-BT or	QDTY000GZS12
	ZENER DIODE UZ-12BSA	QDTA00UZ12BS
D 234	ZENNER DIODE MTZ5.6B or	MTZ5.6BT
	ZENER DIODE GZS5.6Y-BT or	QDTY00GZS5R6
	ZENER DIODE UZ-5.6BSA	QDTA0UZ5R6BS
D 242	FAST RECOVERY DIODE ERD38-06L	AERD3806L000
D 243	RECTIFIER DIODE ERA22-02KFRB	QDSZ0ERA2202
D 244	FAST RECOVERY DIODE ERB44-02L3	QCDZERB4402L
D 245	RECTIFIER DIODE R2M LF-B1 or	QDDZ0000R2M
	ZENER DIODE EQB01-150	AEQB01150000

Ref. No.	Description	Part No.
D 248	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 249	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 251	ZENNER DIODE MTZ6.8B or	MTZ6.8BT
	ZENER DIODE GZS6.8Y-BT or	QDTY00GZS6R8
	ZENER DIODE UZ-6.8BSA	QDTA0UZ6R8BS
D 252	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 254	ZENNER DIODE MTZ8.2B or	MTZ8.2BT
	ZENNER DIODE GZS8.2Y-BT or	QDTY00GZS8R2
	ZENER DIODE UZ-8.2BSA	QDTA0UZ8R2BS
D 501	RECTIFIER DIODE ERC04-10L3	QDDZ0ERC0410
D 502	RECTIFIER DIODE ERC04-10L3	QDDZ0ERC0410
D 503	RECTIFIER DIODE ERC04-10L3	QDDZ0ERC0410
D 504	RECTIFIER DIODE ERC04-10L3	QDDZ0ERC0410
D 505	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 506	FAST RECOVERY DIODE ERB44-02L3	QCDZERB4402L
D 507	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 509	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
D 510	ZENNER DIODE MTZ15B-T77 or	MTZ15BT
	ZENNER DIODE GZS15Y-BT or	QDTY000GZS15
	ZENER DIODE UZ-15BSA	QDTA00UZ15BS
D 511	SWITCHING DIODE 1SS133 or	1SS133T
	DIODE 1SS176TPA7	1SS176T
	ICS	
IC 201	IC:MICON TMP47C434N-R214	QSMQA0ZTS015
IC 202	IC TC89101P	GTC89101Pxxx
IC 203	IC TC4053BP or	14DW168
	IC BU4053B	14LF166
IC 204	IC LA7830	14LQ163
IC 205	IC AN5265	14LN160
IC 206	IC CXA1213BS	QSBLA0SSN019
IC 207	VOLTAGE REGULATOR IC NJM78M12FA or	14L0242
	IC AN78M12 or	AN78M12
	IC 78M12 or	UPC78M12HF
	IC 78M12	L78M12
IC 208	IC L5631	L5631
IC 209	IC CXA1214P	QSBLA0SSN011
IC 210	IC:VOLTAGE REGULATOR AN78M09 or	AN78M09
	IC 78M09	L78M09
	COILS	
L 204	INDUCTOR 39μH-J-26T or	LLAXJATTU390
	INDUCTOR 39μH(J)	2161390T
L 208	MICRO INDUCTOR 47μH-K-AXT or	2165470T
	MICRO INDUCTOR 47μH-K-5FT	2162470T
L 209	DELAY LINE	113N852
L 210	CASING COIL (PAL) or	LFA07V0MM011
	CASING COIL (PAL)	LFA07V0TK008
L 211	CASING COIL (B-Y) or	LFA07V0MM004
	CASING COIL (B-Y)	LFA07V0TK010
L 212	CASING COIL (R-Y) or	LFA07V0MM004
	CASING COIL (R-Y)	LFA07V0TK010
L 213	MICRO INDUCTOR 10μH or	2165100T
	MICRO INDUCTOR 10μH	2162100T
L 214	MICRO INDUCTOR 33μH-K-AXT or	2165330T
	MICRO INDUCTOR 33μH-K-5FT	2162330T

Ref. No.	Description	Part No.
L 215	MICRO INDUCTOR 15µH-K-AXT or	2165150T
	MICRO INDUCTOR 15µH-K-AXT	2162150T
L 216	CASING COIL (BELL) or	LFA07V0MM003
	CASING COIL (BELL)	LFA07V0TK009
L 217	MICRO INDUCTOR 15µH-K-AXT or	2165150T
	MICRO INDUCTOR 15µH-K-AXT	2162150T
L 218	POT COIL 47µH K	LLBD∗∗DMM001
L 501 ⚠	LINE FILTER 2.5mH or	LLBG00ZBW007
	LINE FILTER 2.5mH or	LLBG00ZMS008
	LINE FILTER 2.5mH	1812745
	TRANSISTORS	
Q 204	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 205	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 206	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 207	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 208	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 209	TRANSISTOR 2SA1318T or	2SA1318T
	TRANSISTOR 2SA1318U or	2SA1318U
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 210	TRANSISTOR 2SA1318T or	2SA1318T
	TRANSISTOR 2SA1318U or	2SA1318U
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 211	TRANSISTOR 2SA1318T or	2SA1318T
	TRANSISTOR 2SA1318U or	2SA1318U
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 213	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 214	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 215	TRANSISTOR 2SA1318T or	2SA1318T
	TRANSISTOR 2SA1318U or	2SA1318U
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 216	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 217	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA

Ref. No.	Description	Part No.
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 218	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 219	TRANSISTOR 2SC2271(D) or	2SC2271D
	TRANSISTOR 2SC2271(E)	2SC2271E
Q 220	TRANSISTOR 2SD2331 LS	QQPZ02SD2331
Q 221	TRANSISTOR 2SA1318T or	2SA1318T
	TRANSISTOR 2SA1318U or	2SA1318U
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267GR	NQS10KTA1267
Q 222	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 223	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 224	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 225	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 227	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 228	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 229	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 233	TRANSISTER 2SB1274(R) or	Q2SB1274R000
	TRANSISTER 2SB1274(S)	Q2SB1274S000
Q 234	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 235	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 236	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 237	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199

Ref. No.	Description	Part No.
Q 239	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 240	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 501	TRANSISTOR 2SD1710CA	QR6Z02SD1710
Q 502	TRANSISTOR 2SC3807	QQPZ02SC3807
Q 504	TRANSISTOR 2SB698(F) or	QQSF002SB698
	TRANSISTOR 2SB698(G)	QQSG002SB698
Q 505 ⚠	PHOTO COUPLER PC111LYS	QPES0PC111LY
Q 506	FET 2SK212E or	2SK212E
	FET 2SK212F	2SK212F
Q 507	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
	RESISTORS	
R 204	CHIP RES. 1/10W J 6.8KΩ	RRXAJBBZ0682
R 205	CHIP RES. 1/10W J 5.6KΩ	RRXAJBBZ0562
R 207	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 214	CHIP RES. 1/10W J 12KΩ	RRXAJBBZ0123
R 215	CHIP RES. 1/10W J 12KΩ	RRXAJBBZ0123
R 216	CARBON RES. 1/6W J 10KΩ or	132A103T
	CARBON RES. 1/5W J 10KΩ	1324103T
R 217	CARBON RES. 1/6W J 10KΩ or	132A103T
	CARBON RES. 1/5W J 10KΩ	1324103T
R 220	CHIP RES. 1/10W J 5.6KΩ	RRXAJBBZ0562
R 221	CHIP RES. 1/10W J 3.9KΩ	RRXAJBBZ0392
R 222	CHIP RES. 1/10W J 12KΩ	RRXAJBBZ0123
R 223	CHIP RES. 1/10W J 12KΩ	RRXAJBBZ0123
R 224	CHIP RES. 1/10W J 68KΩ	RRXAJBBZ0683
R 225	CHIP RES. 1/10W J 4.7KΩ	RRXAJBBZ0472
R 226	CHIP RES. 1/10W J 3.9KΩ	RRXAJBBZ0392
R 227	CHIP RES. 1/10W J 33KΩ	RRXAJBBZ0333
R 228	CHIP RES. 1/10W J 2.2KΩ	RRXAJBBZ0222
R 231	CHIP RES. 1/10W J 47KΩ	RRXAJBBZ0473
R 232	CHIP RES. 1/10W J 47KΩ	RRXAJBBZ0473
R 233	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 234	CHIP RES. 1/10W J 15KΩ	RRXAJBBZ0153
R 235	CHIP RES. 1/10W J 18KΩ	RRXAJBBZ0183
R 236	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 237	CHIP RES. 1/10W J 33KΩ	RRXAJBBZ0333
R 238	CHIP RES. 1/10W J 15KΩ	RRXAJBBZ0153
R 239	CHIP RES. 1/10W J 15KΩ	RRXAJBBZ0153
R 240	CHIP RES. 1/10W J 22KΩ	RRXAJBBZ0223
R 241	CHIP RES. 1/10W J 27KΩ	RRXAJBBZ0273
R 244	CHIP RES. 1/10W J 68KΩ	RRXAJBBZ0683
R 245	CHIP RES. 1/10W J 390Ω	RRXAJBBZ0391
R 246	CHIP RES. 1/10W J 1KΩ	RRXAJBBZ0102
R 247	CHIP RES. 1/10W J 5.6KΩ	RRXAJBBZ0562
R 248	CHIP RES. 1/10W J 1KΩ	RRXAJBBZ0102
R 249	CARBON RES. 1/6W J 150Ω or	132A151T
	CARBON RES. 1/5W J 150Ω	1324151T
R 250	CARBON RES. 1/6W J 2.2KΩ or	132A222T
	CARBON RES. 1/5W J 2.2KΩ	1324222T
R 251	CHIP RES. 1/10W J 1KΩ	RRXAJBBZ0102
R 252	CHIP RES. 1/10W J 1KΩ	RRXAJBBZ0102

Ref. No.	Description	Part No.
R 253	CHIP RES. 1/10W J 1KΩ	RRXAJBBZ0102
R 254	CHIP RES. 1/10W J 1.5KΩ	RRXAJBBZ0152
R 260	CARBON RES. 1/6W J 330Ω or	132A331T
	CARBON RES. 1/5W J 330Ω	1324331T
R 262	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 263	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 264	CHIP RES. 1/10W J 33KΩ	RRXAJBBZ0333
R 265	CHIP RES. 1/10W J 2.7KΩ	RRXAJBBZ0272
R 266	CHIP RES. 1/10W J 12KΩ	RRXAJBBZ0123
R 267	CHIP RES. 1/10W J 5.6KΩ	RRXAJBBZ0562
R 268	CHIP RES. 1/10W J 1.8KΩ	RRXAJBBZ0182
R 269	CHIP RES. 1/10W J 2.7KΩ	RRXAJBBZ0272
R 270	CHIP RES. 1/10W J 18KΩ	RRXAJBBZ0183
R 271	CHIP RES. 1/10W J 22KΩ	RRXAJBBZ0223
R 272	CHIP RES. 1/10W J 8.2KΩ	RRXAJBBZ0822
R 273	CHIP RES. 1/10W J 68KΩ	RRXAJBBZ0683
R 274	CHIP RES. 1/10W J 3.9KΩ	RRXAJBBZ0392
R 275	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 276	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 277	CHIP RES. 1/10W J 1KΩ	RRXAJBBZ0102
R 278	CARBON RES. 1/6W J 10KΩ or	132A103T
	CARBON RES. 1/5W J 10KΩ	1324103T
R 279	CHIP RES. 1/10W J 47KΩ	RRXAJBBZ0473
R 280	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 281	CHIP RES. 1/10W J 82KΩ	RRXAJBBZ0823
R 282	CHIP RES. 1/10W J 56KΩ	RRXAJBBZ0563
R 283	CHIP RES. 1/10W J 33KΩ	RRXAJBBZ0333
R 284	CHIP RES. 1/10W J 470Ω	RRXAJBBZ0471
R 285	CHIP RES. 1/10W J 1KΩ	RRXAJBBZ0102
R 286	CHIP RES. 1/10W J 15KΩ	RRXAJBBZ0153
R 287	CHIP RES. 1/10W J 68KΩ	RRXAJBBZ0683
R 288	CHIP RES. 1/10W J 68KΩ	RRXAJBBZ0683
R 289	CHIP RES. 1/10W J 12KΩ	RRXAJBBZ0123
R 290	CHIP RES. 1/10W J 12KΩ	RRXAJBBZ0123
R 291	CARBON RES. 1/4W J 1Ω or	1345109S
	CARBON RES. 1/4W J 1Ω	RCX4JATZ0109
R 292	CARBON RES. 1/4W J 2.2Ω or	1345229S
	CARBON RES. 1/4W J 2.2Ω	RCX4JATZ0229
R 296	CARBON RES. 1/4W J 1KΩ or	1345102S
	CARBON RES. 1/4W J 1KΩ	RCX4JATZ0102
R 298	CHIP RES. 1/10W J 4.7KΩ	RRXAJBBZ0472
R 301	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 302	CHIP RES. 1/10W J 18KΩ	RRXAJBBZ0183
R 303	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 304	CHIP RES. 1/10W J 560Ω	RRXAJBBZ0561
R 305	CHIP RES. 1/10W J 4.7Ω	RRXAJBBZ04R7
R 306	CARBON RES. 1/4W J 220Ω or	1345221S
	CARBON RES. 1/4W J 220Ω	RCX4JATZ0221
R 307	FUSE RES. 2.2Ω 1W or	RF01229KA004
	FUSE RES. 1W J 2.2Ω	5363229
R 308	FUSE RES. 2.2Ω 1W or	RF01229KA004
	FUSE RES. 1W J 2.2Ω	5363229
R 310	CARBON RES. 1/6W J 5.6KΩ or	132A562T
	CARBON RES. 1/5W J 5.6KΩ	1324562T
R 311	CARBON RES. 1/6W J 5.6KΩ or	132A562T
	CARBON RES. 1/5W J 5.6KΩ	1324562T
R 314	CHIP RES. 1/10W J 820Ω	RRXAJBBZ0821
R 315	CARBON RES. 1/4W J 2.2KΩ or	1345222S
	CARBON RES. 1/4W J 2.2KΩ	RCX4JATZ0222

Ref. No.	Description	Part No.
R 316	CEMENT RES. 5W K 3.3KΩ or	RW05332PG003
	CEMENT RES. 3.3KΩ 5W or	RW05332UB001
	CEMENT RES. 5W K 3.3KΩ	RW05332KA006
R 317	CHIP RES. 1/10W J 82KΩ	RRXAJBBZ0823
R 318	CARBON RES. 1/6W J 12KΩ or	132A123T
	CARBON RES. 1/5W J 12KΩ	1324123T
R 319	CHIP RES. 1/10W J 12KΩ	RRXAJBBZ0123
R 320	CHIP RES. 1/10W J 100KΩ	RRXAJBBZ0104
R 321	CARBON RES. 1/6W J 220KΩ or	132A224T
	CARBON RES. 1/5W J 220KΩ	1324224T
R 322	CHIP RES. 1/10W J 1.8KΩ	RRXAJBBZ0182
R 323	CHIP RES. 1/10W J 27KΩ	RRXAJBBZ0273
R 324	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 325	CHIP RES. 1/10W J 1.5KΩ	RRXAJBBZ0152
R 326	CHIP RES. 1/10W J 1.8KΩ	RRXAJBBZ0182
R 327	CHIP RES. 1/10W J 100KΩ	RRXAJBBZ0104
R 328	CHIP RES. 1/10W J 100KΩ	RRXAJBBZ0104
R 329	CHIP RES. 1/10W J 6.8KΩ	RRXAJBBZ0682
R 330	CHIP RES. 1/10W J 4.7KΩ	RRXAJBBZ0472
R 331	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 332	CHIP RES. 1/10W J 47KΩ	RRXAJBBZ0473
R 333	CHIP RES. 1/10W J 680KΩ	RRXAJBBZ0684
R 335	CHIP RES. 1/10W J 270Ω	RRXAJBBZ0271
R 336	CHIP RES. 1/10W J 180Ω	RRXAJBBZ0181
R 337	CHIP RES. 1/10W J 4.7KΩ	RRXAJBBZ0472
R 338	CHIP RES. 1/10W J 470Ω	RRXAJBBZ0471
R 339	CHIP RES. 1/10W J 330KΩ	RRXAJBBZ0334
R 340	CHIP RES. 1/10W J 330Ω	RRXAJBBZ0331
R 341	CHIP RES. 1/10W J 5.6KΩ	RRXAJBBZ0562
R 346	METALIZED FILM RES. 1/5W F 27KΩ	13C2702
R 347	CHIP RES. 1/10W J 4.7KΩ	RRXAJBBZ0472
R 348	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 349	CHIP RES. 1/10W J 27KΩ	RRXAJBBZ0273
R 350	CHIP RES. 1/10W J 3.3MΩ	RRXAJBBZ0335
R 351	CHIP RES. 1/10W J 390Ω	RRXAJBBZ0391
R 355	CHIP RES. 1/10W J 47KΩ	RRXAJBBZ0473
R 356	CARBON RES. 1/6W J 470Ω or	132A471T
	CARBON RES. 1/5W J 470Ω	1324471T
R 357	CHIP RES. 1/10W J 390Ω	RRXAJBBZ0391
R 358	CHIP RES. 1/10W J 820Ω	RRXAJBBZ0821
R 359	CHIP RES. 1/10W J 1KΩ	RRXAJBBZ0102
R 360	CARBON RES. 1/6W J 270Ω or	132A271T
	CARBON RES. 1/5W J 270Ω	1324271T
R 361	CHIP RES. 1/10W J 390Ω	RRXAJBBZ0391
R 362	CHIP RES. 1/10W J 4.7KΩ	RRXAJBBZ0472
R 363	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 364	CHIP RES. 1/10W J 390Ω	RRXAJBBZ0391
R 365	CHIP RES. 1/10W J 270Ω	RRXAJBBZ0271
R 366	CHIP RES. 1/10W J 470Ω	RRXAJBBZ0471
R 367	CHIP RES. 1/10W J 2.2KΩ	RRXAJBBZ0222
R 368	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 369	CHIP RES. 1/10W J 22KΩ	RRXAJBBZ0223
R 396	CARBON RES. 1/6W J 150KΩ or	132A154T
	CARBON RES. 1/5W J 150KΩ	1324154T
R 397	CARBON RES. 1/6W J 10KΩ or	132A103T
	CARBON RES. 1/5W J 10KΩ	1324103T
R 398	CARBON RES. 1/6W J 33KΩ or	132A333T
	CARBON RES. 1/5W J 33KΩ	1324333T
R 399	CARBON RES. 1/4W J 1.5KΩ or	1345152S
	CARBON RES. 1/4W J 1.5KΩ	RCX4JATZ0152

Ref. No.	Description	Part No.
R 400	CARBON RES. 1/6W J 22KΩ or	132A223T
	CARBON RES. 1/5W J 22KΩ	1324223T
R 401	CARBON RES. 1/6W J 27KΩ or	132A273T
	CARBON RES. 1/5W J 27KΩ	1324273T
R 402	CARBON RES. 1/6W J 10KΩ or	132A103T
	CARBON RES. 1/5W J 10KΩ	1324103T
R 403	CARBON RES. 1/6W J 5.6KΩ or	132A562T
	CARBON RES. 1/5W J 5.6KΩ	1324562T
R 404	CARBON RES. 1/6W J 100KΩ or	132A104T
	CARBON RES. 1/5W J 100KΩ	1324104T
R 405	CARBON RES. 1/6W J 120KΩ or	132A124T
	CARBON RES. 1/5W J 120KΩ	1324124T
R 406	CARBON RES. 1/6W J 47KΩ or	132A473T
	CARBON RES. 1/5W J 47KΩ	1324473T
R 407	CARBON RES. 1/6W J 22KΩ or	132A223T
	CARBON RES. 1/5W J 22KΩ	1324223T
R 408	METAL RES. 1W J 15KΩ or	RN01JZDZ0153
	METAL RES. 1W J 15KΩ	534A153
R 410	CARBON RES. 1/6W J 180Ω or	132A181T
	CARBON RES. 1/5W J 180Ω	1324181T
R 411	CHIP RES. 1/10W J 2.7KΩ	RRXAJBBZ0272
R 412	METAL RES. 2W J 27Ω or	RN02JZDZ0270
	METAL RES. 2W J 27Ω	534B270
R 413	CHIP RES. 1/10W J 68KΩ	RRXAJBBZ0683
R 414	CHIP RES. 1/10W J 27KΩ	RRXAJBBZ0273
R 415	CARBON RES. 1/6W J 10KΩ or	132A103T
	CARBON RES. 1/5W J 10KΩ	1324103T
R 416	CARBON RES. 1/6W J 3.3KΩ or	132A332T
	CARBON RES. 1/5W J 3.3KΩ	1324332T
R 417	CHIP RES. 1/10W J 100Ω	RRXAJBBZ0101
R 418	FUSE RES. 1/2W J 2.2Ω or	5367229
	FUSE RES. 1/2W J 2.2Ω	5362229
R 430	CHIP RES. 1/10W J 2.2KΩ	RRXAJBBZ0222
R 431	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 433	CHIP RES. 1/10W J 180Ω	RRXAJBBZ0181
R 434	CHIP RES. 1/10W J 3.3KΩ	RRXAJBBZ0332
R 435	CHIP RES. 1/10W J 4.7KΩ	RRXAJBBZ0472
R 436	CHIP RES. 1/10W J 100KΩ	RRXAJBBZ0104
R 437	CHIP RES. 1/10W J 100KΩ	RRXAJBBZ0104
R 440	CHIP RES. 1/10W J 3.3KΩ	RRXAJBBZ0332
R 441	CARBON RES. 1/6W J 47Ω or	132A470T
	CARBON RES. 1/5W J 47Ω	1324470T
R 442	CARBON RES. 1/6W J 33KΩ or	132A333T
	CARBON RES. 1/5W J 33KΩ	1324333T
R 443	CARBON RES. 1/6W J 33KΩ or	132A333T
	CARBON RES. 1/5W J 33KΩ	1324333T
R 446	CARBON RES. 1/6W J 10KΩ or	132A103T
	CARBON RES. 1/5W J 10KΩ	1324103T
R 447	CARBON RES. 1/6W J 10KΩ or	132A103T
	CARBON RES. 1/5W J 10KΩ	1324103T
R 501	CEMENT RES. 5W K 1.2Ω or	RW051R2PG001
	CEMENT RES. 5W K 1.2Ω or	RW051R2UB001
	CEMENT RES. 5W K 1.2Ω	RW051R2KA006
R 502	CARBON RES. 1/4W J 120KΩ or	1345124S
	CARBON RES. 1/4W J 120KΩ	RCX4JATZ0124
R 503	CARBON RES. 1/4W J 120KΩ or	1345124S
	CARBON RES. 1/4W J 120KΩ	RCX4JATZ0124
R 504	CARBON RES. 1/4W J 15KΩ or	1345153S
	CARBON RES. 1/4W J 15KΩ	RCX4JATZ0153

Ref. No.	Description	Part No.
R 505	CARBON RES. 1/4W J 220Ω or	1345221S
	CARBON RES. 1/4W J 220Ω	RCX4JATZ0221
R 506	CARBON RES. 1/4W J 1.5KΩ or	1345152S
	CARBON RES. 1/4W J 1.5KΩ	RCX4JATZ0152
R 507	METAL RES. 2W J 82Ω or	RN02JZDZ0820
	METAL RES. 2W J 82Ω	534B820
R 508	METAL RES. 3W J 68Ω or	RN03680KE003
	METAL RES. 3W J 68Ω or	RN03JZDZ0680
	METAL RES. 3W J 68Ω	RN03680KA001
R 509	CARBON RES. 1/6W J 470Ω or	132A471T
	CARBON RES. 1/5W J 470Ω	1324471T
R 510	CARBON RES. 1/6W J 22KΩ or	132A223T
	CARBON RES. 1/5W J 22KΩ	1324223T
R 512	METAL RES. 2W J 0.68KΩ or	RN02JZDZ068A
	METAL RES. 2W J 0.68KΩ	534B68A
R 513	CARBON RES. 1/4W J 5.6KΩ or	1345562S
	CARBON RES. 1/4W J 5.6KΩ	RCX4JATZ0562
R 514	METAL RES. 3W J 33Ω or	RN03330KE003
	METAL RES. 3W J 33Ω or	RN03JZDZ0330
	METAL RES. 3W J 33Ω	RN03330KA001
R 517	CARBON RES. 1/6W J 1.2MΩ or	132A125T
	CARBON RES. 1/5W J 1.2MΩ	1324125T
R 518	CARBON RES. 1/6W J 1MΩ or	132A105T
	CARBON RES. 1/5W J 1MΩ	1324105T
R 519	CARBON RES. 1/6W J 330Ω or	132A331T
	CARBON RES. 1/5W J 330Ω	1324331T
R 520	CARBON RES. 1/6W J 47KΩ or	132A473T
	CARBON RES. 1/5W J 47KΩ	1324473T
R 521	CARBON RES. 1/6W J 27KΩ or	132A273T
	CARBON RES. 1/5W J 27KΩ	1324273T
R 522	CARBON RES. 1/4W J 560KΩ or	1345564S
	CARBON RES. 1/4W J 560KΩ	RCX4JATZ0564
JW 202	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 203	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 204	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 205	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 206	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 207	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 208	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 210	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 211	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 213	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 214	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 215	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 216	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 217	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 218	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 220	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 221	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 222	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 223	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 224	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 226	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 227	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 228	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 230	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 232	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 233	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 234	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 240	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000

Ref. No.	Description	Part No.
JW 241	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 250	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
	SWITCHES	
SW 201	TACT SWITCH SKHHBV or	SST0101AL013
	LIGHT TOUCH SWITCH EVQPAC07K	SST0101MS013
SW 202	TACT SWITCH SKHHBV or	SST0101AL013
	LIGHT TOUCH SWITCH EVQPAC07K	SST0101MS013
SW 203	TACT SWITCH SKHHBV or	SST0101AL013
	LIGHT TOUCH SWITCH EVQPAC07K	SST0101MS013
SW 204	TACT SWITCH SKHHBV or	SST0101AL013
	LIGHT TOUCH SWITCH EVQPAC07K	SST0101MS013
SW 205	TACT SWITCH SKHHBV or	SST0101AL013
	LIGHT TOUCH SWITCH EVQPAC07K	SST0101MS013
SW 206	TACT SWITCH SKHHBV or	SST0101AL013
	LIGHT TOUCH SWITCH EVQPAC07K	SST0101MS013
SW 207	TACT SWITCH SKHHBV or	SST0101AL013
	LIGHT TOUCH SWITCH EVQPAC07K	SST0101MS013
SW 208	TACT SWITCH SKHHBV or	SST0101AL013
	LIGHT TOUCH SWITCH EVQPAC07K	SST0101MS013
SW 209	SLIDE SWITCH SSV-22-0300 or	SSS0202DK001
	SLIDE SWITCH or	1621654
	SLIDE SWITCH or	SSS0202WM001
	SLIDE SWITCH	SSS0202HZ003
SW 501 ⚠	PUSH SWITCH SPPW81-6.55-A2	SPP0AAZMS001
	TRANSFORMERS	
T 201 ⚠	FLYBACK TRANS 154-064M [GOLD STAr] or	LTF00EPGS001
	FLYBACK TRANS FCK-14B025 [SAMSUNG]	LTF00EPSM002
T 202	H DRIVE TRANS TE-1410	1150325
T 501 ⚠	POWER TRANS TS8045VA	LTT00EPMS011
	VARIABLE RESISTORS	
VR 202	POTENTIOMETER 50KΩ B	138J784
VR 203	POTENTIOMETER 500Ω B	138J776
VR 204	POTENTIOMETER 500Ω B	138J776
VR 205	POTENTIOMETER 2KΩ B H	138J778
	MISCELLANEOUS	
A 3	POWER KNOB	0EM401485
B 3	LED TUBE	0EM401473
B 4	SENSOR HOLDER	0EM401471
B 5	CUSHION	0EM401374
DL 201	GLASS DELAY EFDEN645A61H or	1813554
	GLASS DELAY	1812056
F 501 ⚠	FUSE T4.0AH 250V	PAGC20BAG402
FH 501	HOLDER FUSE FH-V-03078 or	XH01Z00DK001
	HOLDER FUSE CNT41-0014	1790424
FH 502	HOLDER FUSE FH-V-03078 or	XH01Z00DK001
	HOLDER FUSE CNT41-0014	1790424
HS 1	HEAT SINK PR (for Q501)	0EM300441
HS 2	HEAT SINK PS (for IC204/IC207)	0EM401145
IP 201	IC PROTECTOR ICP-N10	579F085Z
IP 202	IC PROTECTOR ICP-N20	579F087Z
J 201	EARPHONE JACK HSJ1403-01-010	JYSL030HD002
J 202	RCA JACK JPJ2030-01-030	JXRL010HD001
J 203	BNC JACK or	JXNL010RA002
	BNC JACK	JXNL010HD002
L 1	SCREW B-TIGHT BIND HEAD 3X8	GBMB3080
LD 2	RIBBON WIRE 3P	WX1L7401-003
LD 3	RIBBON WIRE 6P	WX1L7401-004
PS 501	POSISTOR ZP853BL200C	5790117

Ref. No.	Description	Part No.
TP 1	TEST PIN or	1700093
	TEST PIN SJT-743-3	1740354
TP 2	TEST PIN or	1700093
	TEST PIN SJT-743-3	1740354
TP 3	TEST PIN or	1700093
	TEST PIN SJT-743-3	1740354
TP 4	TEST PIN or	1700093
	TEST PIN SJT-743-3	1740354
TP 5	TEST PIN or	1700093
	TEST PIN SJT-743-3	1740354
TU 201	TUNER UNIT ENV-79836-F2	UTUNPSDMS001
U 201	REMOTE SENSOR UNIT CMXX920F-S	USESJRSSN001
W 501 ⚠	AC CORD LA-1398	WAE0192LW001
XT 201	CERALOCK 4.19MHz or	1812885
	CERAMIC RESONATOR KBR-4.19MKS	1813682
XT 202	SERAMIC RESONATOR CSB500F2	1812039
XT 203	CRYSTAL OSILLATOR 4.43MHz	1811387
XT 204	CRYSTAL OSILLATOR 3.579545KHz	1811291
	LEAD CLAMPER or	1790256
	LEAD CLAMPER	1790356

CRT PCB (MMA-B)

Ref. No.	Description	Part No.
	CRT PCB (MMA-B) Consists of the following:	----------
	CAPACITORS	
C 601 ⚠	CERAMIC CAP. 0.01µF/2KV or	CCD3DZP0E103
	CERAMIC CAP. 0.01µF/2KV	6220602
C 602	CHIP CERAMIC CAP. SL J 270pF/50V	CHE1JJBSL271
C 603	CHIP CERAMIC CAP. SL J 270pF/50V	CHE1JJBSL271
C 604	CHIP CERAMIC CAP. SL J 330pF/50V	CHE1JJBSL331
	CONNECTORS	
CN 601	CRT SOCKET HPS1171-01-020 or	1780080
	CRT SOCKET CVT3308-1301	1780218
CN 602	CONNECTOR PIN 1P or	1700576
	CONNECTOR PIN 1P RT-01N-2.3A	1730688
CN 603	WIRE HOLDER 3P 51039-0300 or	XW01D03NF001
	WIRE HOLDER 3P 51039-0300	XW01B03NF001
CN 604	WIRE HOLDER 6P 51039-0600 or	XW01D06NF001
	WIRE HOLDER 6P 51039-0600	XW01B06NF001
	TRANSISTORS	
Q 601	TRANSISTOR 2SC2228(D) or	2SC2228D
	TRANSISTOR 2SC2228(E)	2SC2228E
Q 602	TRANSISTOR 2SC2228(D) or	2SC2228D
	TRANSISTOR 2SC2228(E)	2SC2228E
Q 603	TRANSISTOR 2SC2228(D) or	2SC2228D
	TRANSISTOR 2SC2228(E)	2SC2228E
	RESISTORS	
R 601	CARBON RES. 1/4W J 1.8KΩ or	RCX4JATZ0182
	CARBON RES. 1/4W J 1.8KΩ	1345182S
R 602	CARBON RES. 1/4W J 1.8KΩ or	RCX4JATZ0182
	CARBON RES. 1/4W J 1.8KΩ	1345182S
R 603	CARBON RES. 1/4W J 1.8KΩ or	RCX4JATZ0182
	CARBON RES. 1/4W J 1.8KΩ	1345182S
R 604	CARBON RES. 1/4W J 1.5KΩ or	RCX4JATZ0152
	CARBON RES. 1/4W J 1.5KΩ	1345152S
R 605	CARBON RES. 1/4W J 1.5KΩ or	RCX4JATZ0152
	CARBON RES. 1/4W J 1.5KΩ	1345152S

Ref. No.	Description	Part No.
R 606	CARBON RES. 1/4W J 1.5KΩ or	RCX4JATZ0152
	CARBON RES. 1/4W J 1.5KΩ	1345152S
R 607	CHIP RES. 1/10W J 2.7KΩ	RRXAJBBZ0272
R 608	CHIP RES. 1/10W J 820Ω	RRXAJBBZ0821
R 609	CHIP RES. 1/10W J 220Ω	RRXAJBBZ0221
R 610	CHIP RES. 1/10W J 2.7KΩ	RRXAJBBZ0272
R 611	CHIP RES. 1/10W J 1.5KΩ	RRXAJBBZ0152
R 612	CHIP RES. 1/10W J 820Ω	RRXAJBBZ0821
R 613	CHIP RES. 1/10W J 220Ω	RRXAJBBZ0221
R 614	CHIP RES. 1/10W J 2.2KΩ	RRXAJBBZ0222
R 615	CHIP RES. 1/10W J 820Ω	RRXAJBBZ0821
R 616	CHIP RES. 1/10W J 220Ω	RRXAJBBZ0221
R 617	METAL RES. 1W J 15KΩ or	RN01JZDZ0153
	METAL RES. 1W J 15KΩ	534A153
R 618	METAL RES. 1W J 15KΩ or	RN01JZDZ0153
	METAL RES. 1W J 15KΩ	534A153
R 619	METAL RES. 1W J 15KΩ or	RN01JZDZ0153
	METAL RES. 1W J 15KΩ	534A153
R 620	CHIP RES. 1/10W J 2.2KΩ	RRXAJBBZ0222
R 621	CHIP RES. 1/10W J 470Ω	RRXAJBBZ0471
R 622	CHIP RES. 1/10W J 2.2KΩ	RRXAJBBZ0222
R 623	CHIP RES. 1/10W J 470Ω	RRXAJBBZ0471
R 624	CHIP RES. 1/10W J 2.2KΩ	RRXAJBBZ0222
R 625	CHIP RES. 1/10W J 470Ω	RRXAJBBZ0471
R 626	CHIP RES. 1/10W J 270Ω	RRXAJBBZ0271
R 627	CHIP RES. 1/10W J 270Ω	RRXAJBBZ0271
R 628	CHIP RES. 1/10W J 270Ω	RRXAJBBZ0271
JW 601	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 602	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 603	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 604	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
	VARIABLE RESISTORS	
VR 601	POTENTIOMETER 50KΩ B	138J920
VR 602	POTENTIOMETER 3KΩ B	138J915
VR 603	POTENTIOMETER 3KΩ B	138J915
VR 604	POTENTIOMETER 5KΩ B	138J916
VR 605	POTENTIOMETER 5KΩ B	138J916
VR 606	POTENTIOMETER 5KΩ B	138J916

IF PCB (MMA-C)

Ref. No.	Description	Part No.
	IF PCB (MMA-C) Consists of the following:	----------
	CAPACITORS	
C 101	CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JJBSL220
C 102	CHIP CERAMIC CAP. SL J 10pF/50V	CHE1JJBSL100
C 103	CHIP CERAMIC CAP. B K 0.01µF/50V	CHE1JKB0B103
C 104	MYLAR CAP. 0.068µF/50V K	2250683S
C 105	CHIP CERAMIC CAP. B K 0.001µF/50V	CHE1JKB0B102
C 106	ELECTROLYTIC CAP. 0.47µF/50V M	126F474S
C 107	ELECTROLYTIC CAP. 4.7µF/50V M	126F475S
C 108	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 110	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 111	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 112	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 113	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 120	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 121	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103

Ref. No.	Description	Part No.
C 122	CHIP CERAMIC CAP. CH J 130pF/50V	CHE1JJBCH131
C 124	CHIP CERAMIC CAP. SL J 27pF/50V	CHE1JJBSL270
C 125	CHIP CERAMIC CAP. SL J 33pF/50V	CHE1JJBSL330
C 126	CHIP CERAMIC CAP. SL J 22pF/50V	CHE1JJBSL220
C 127	CHIP CERAMIC CAP. SL J 27pF/50V	CHE1JJBSL270
C 128	ELECTROLYTIC CAP. 47µF/50V M	126F476S
C 129	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C 130	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
	CONNECTORS	
CN 101	PCB CONNECTOR 6P TXX-P06P-G1	1770989
CN 102	PCB CONNECTOR 3P TXX-P03P-G1 (L TYPE)	1770986
CN 103	CONNECTOR BASE 4P (EH/TOP)	1730628
CN 104	CONNECTOR BASE 3P (EH/TOP)	1730627
	COILS	
L 101	MICRO INDUCTOR 1µH or	2165109T
	MICRO INDUCTOR 1µH	2162109T
L 102	MICRO INDUCTOR 0.68µH or	2165688T
	MICRO INDUCTOR 0.68µH	2162688T
L 104	MICRO INDUCTOR 10µH or	2165100T
	MICRO INDUCTOR 10µH	2162100T
L 105	MICRO INDUCTOR 10µH or	2165100T
	MICRO INDUCTOR 10µH	2162100T
L 106	CASING COIL	LFA07V0MM001
L 107	CASING COIL	LFA07V0MM002
	TRANSISTORS	
Q 102	TRANSISTOR 2SC3331(T) or	QSC3331TNPAA
	TRANSISTOR 2SC3331(U) or	QSC3331UNPAA
	TRANSISTOR KTC3198GR TO-92 or	NQS40KTC3198
	TRANSISTOR KTC3199GR	NQS10KTC3199
Q 103	TRANSISTOR 2SC3000D or	2SC3000D
	TRANSISTOR 2SC3000E	2SC3000E
Q 104	TRANSISTOR 2SA1318T or	2SA1318T
	TRANSISTOR 2SA1318U or	2SA1318U
	TRANSISTOR KTA1266GR TO-92 or	NQS40KTA1266
	TRANSISTOR KTA1267(GR)	NQS10KTC1267
	RESISTORS	
R 101	CHIP RES. 1/10W J 470Ω	RRXAJBBZ0471
R 102	CHIP RES. 1/10W J 390Ω	RRXAJBBZ0391
R 103	CHIP RES. 1/10W J 470Ω	RRXAJBBZ0471
R 104	CHIP RES. 1/10W J 330Ω	RRXAJBBZ0331
R 105	CHIP RES. 1/10W J 5.6KΩ	RRXAJBBZ0562
R 106	CHIP RES. 1/10W J 1.8KΩ	RRXAJBBZ0182
R 107	CHIP RES. 1/10W J 22KΩ	RRXAJBBZ0223
R 108	CHIP RES. 1/10W J 560Ω	RRXAJBBZ0561
R 109	CHIP RES. 1/10W J 10KΩ	RRXAJBBZ0103
R 110	CHIP RES. 1/10W J 560Ω	RRXAJBBZ0561
R 111	CHIP RES. 1/10W J 1.5KΩ	RRXAJBBZ0152
R 112	CHIP RES. 1/10W J 82KΩ	RRXAJBBZ0823
R 113	CHIP RES. 1/10W J 180KΩ	RRXAJBBZ0184
R 115	CHIP RES. 1/10W J 330Ω	RRXAJBBZ0331
R 116	CHIP RES. 1/10W J 560Ω	RRXAJBBZ0561
R 117	CHIP RES. 1/10W J 5.6KΩ	RRXAJBBZ0562
R 118	CHIP RES. 1/10W J 33Ω	RRXAJBBZ0330
R 119	CHIP RES. 1/10W J 1.5KΩ	RRXAJBBZ0152
R 120	CHIP RES. 1/10W J 68Ω	RRXAJBBZ0680
R 122	CHIP RES. 1/10W J 120KΩ	RRXAJBBZ0124
R 123	CHIP RES. 1/10W J 100KΩ	RRXAJBBZ0104
R 124	CHIP RES. 1/10W J 1.8KΩ	RRXAJBBZ0182
R 126	CHIP RES. 1/10W J 1KΩ	RRXAJBBZ0102

Ref. No.	Description	Part No.
R 128	CHIP RES. 1/10W J 3.3KΩ	RRXAJBBZ0332
R 129	CHIP RES. 1/10W J 120Ω	RRXAJBBZ0121
R 130	CHIP RES. 1/10W J 1.5KΩ	RRXAJBBZ0152
R 131	CHIP RES. 1/10W J 560Ω	RRXAJBBZ0561
R 132	CHIP RES. 1/10W J 100Ω	RRXAJBBZ0101
JW 235	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 236	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 237	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
JW 239	CHIP RES. 1/10W J 0Ω	RRXAJBBZ0000
	VARIABLE RESISTOR	
VR 101	POTENTIOMETER 10KΩ B V	138J917
	MISCELLANEOUS	
CF 101	CERAMIC DISCRE CDA5.5MC26	1812020
CF 102	CERAMIC DISCRE CDA6.5MC26	1813594
CF 103	CERAMIC TRAP TPW02B	1813593
CF 104	CERAMIC FILTER SFE5.5MBF	1812018
CF 105	CARAMIC FILTER SFE6.5MB	1813595
IC 101	IC LA7530N	14LQ162
SAW101	SAW FILTER KAF-38.0MR-MH	FBB386PKC001

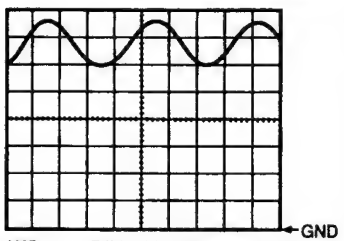
CHASSIS ELECTRICAL PARTS

Ref. No.	Description	Part No.
CRT 1 ⚠	CRT 370KBR22-TC09 (SPYB) or	1812341
	CRT 37GDA85X-TC01(P) or	1812724
	CRT A34KPU02XX48	TCRT190GS011
L 502 ⚠	DEGAUSSING COIL or	LLBH00ZTZ011
	DEGAUSSING COIL	LLBH00ZAB006
LD 1	WIRE ASS'Y	WX1L7500-001
LD 4	WIRE ASS'Y	WX1L7401-001
SP 801	SPEAKER S08J59A or	1520614
	SPEAKER R77A80A32X009 or	DSD0808DJ001
	SPEAKER SG-3B018B	152N589

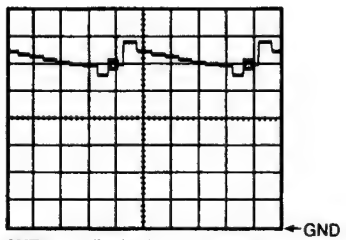
WAVEFORMS

INPUT : PAL Color Bar Signal (with 1KHz Audio Signal)
RECEIVING CH. : E2 ch (48.25 MHz)
PRESET MODE : Press Picture Select button on the remote control unit, then press the number "1" button.
(Brightness— Center Color— Center Contrast— Approx 70%)

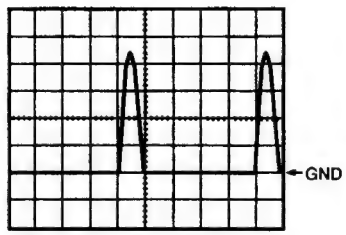
WF1 ~ WF20 = Waveforms to be observed at Waveform check points. (Shown in Schematic Diagram.)



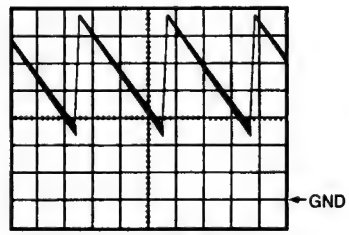
WF1 1DIV: 1V 0.2msec



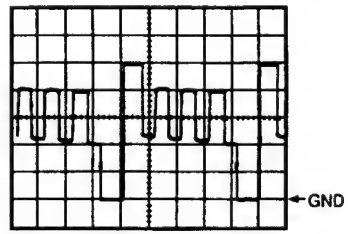
WF5 1DIV: 1V 10 μsec



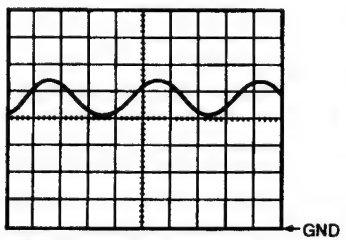
WF10 1DIV: 250V 10 μsec



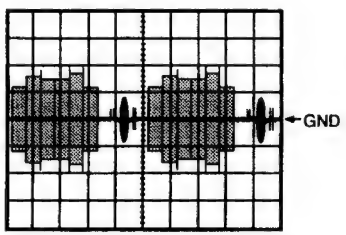
WF13 1DIV: 0.5V 5msec



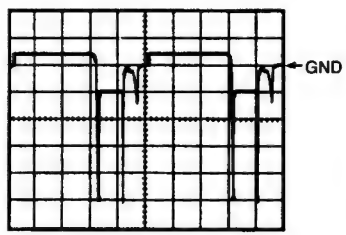
WF17 1DIV: 1V 10 μsec



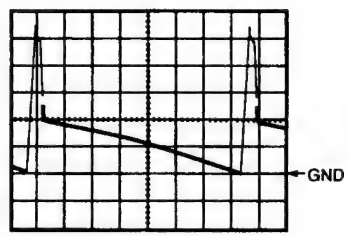
WF2 1DIV: 1V 0.2msec



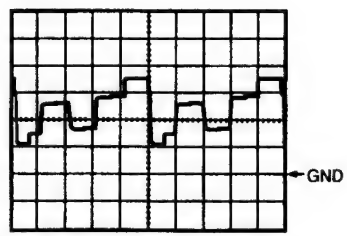
WF6 1DIV: 50mV 10 μsec



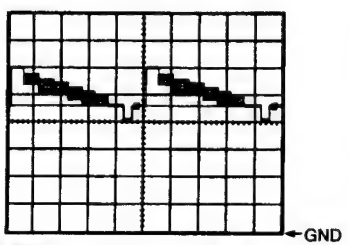
WF9 1DIV: 2V 10 μsec



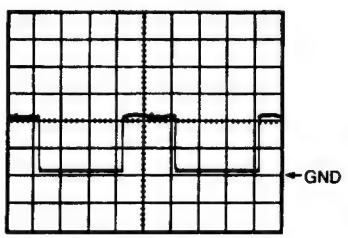
WF14 1DIV: 10V 2msec



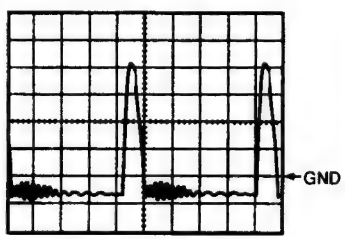
WF18 1DIV: 50V 10 μsec



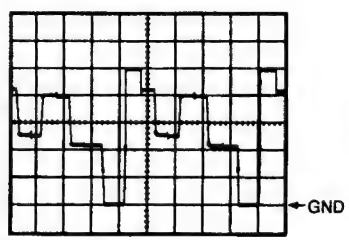
WF3 1DIV: 1V 10 μsec



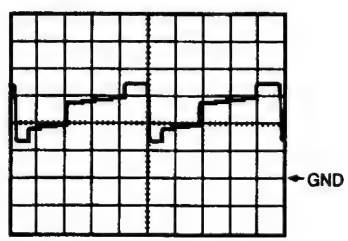
WF7 1DIV: 0.5V 10 μsec



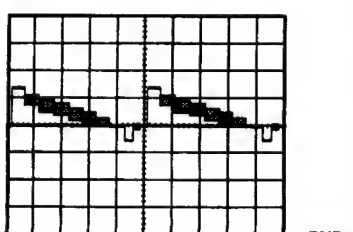
WF11 1DIV: 5V 10 μsec



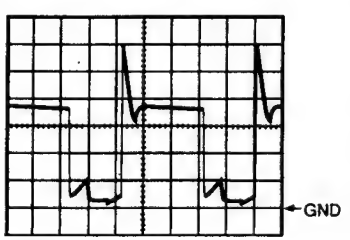
WF15 1DIV: 1V 10 μsec



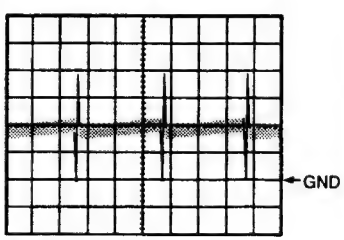
WF19 1DIV: 50V 10 μsec



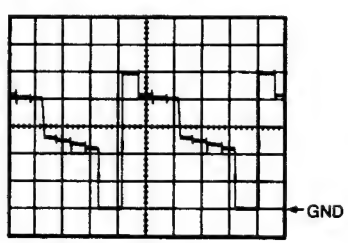
WF4 1DIV: 1V 10 μsec



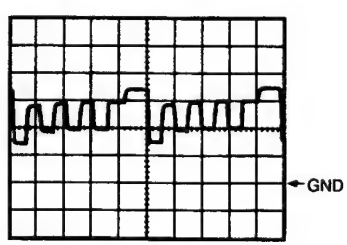
WF8 1DIV: 20V 10 μsec



WF12 1DIV: 0.5V 5msec

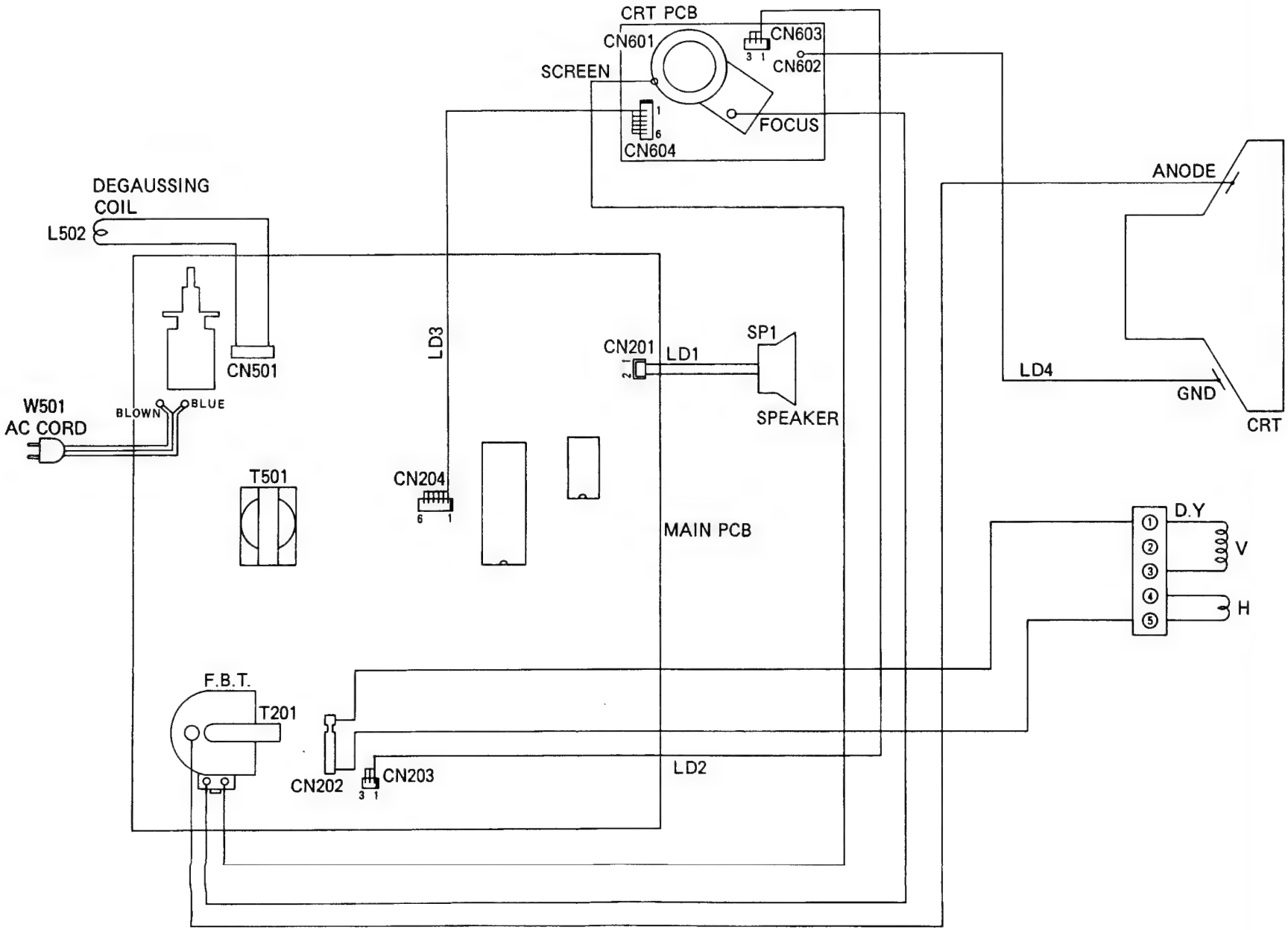


WF16 1DIV: 1V 10 μsec



WF20 1DIV: 50V 10 μsec

WIRING DIAGRAM

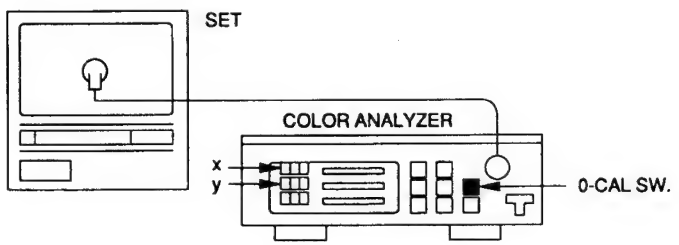


L7480WI

15. WHITE BALANCE ADJUSTMENT

Purpose: To mix red, green and blue beams correctly for pure white.
Symptom of Misadjustment: White becomes bluish or reddish.

Test Point	Adjustment Point	Input
Screen	VR602, VR603	White Raster (APL 100%)
Equipment		**Spec.**
Pattern Generator Color Analyzer		See below
Connections of M. EQ.		

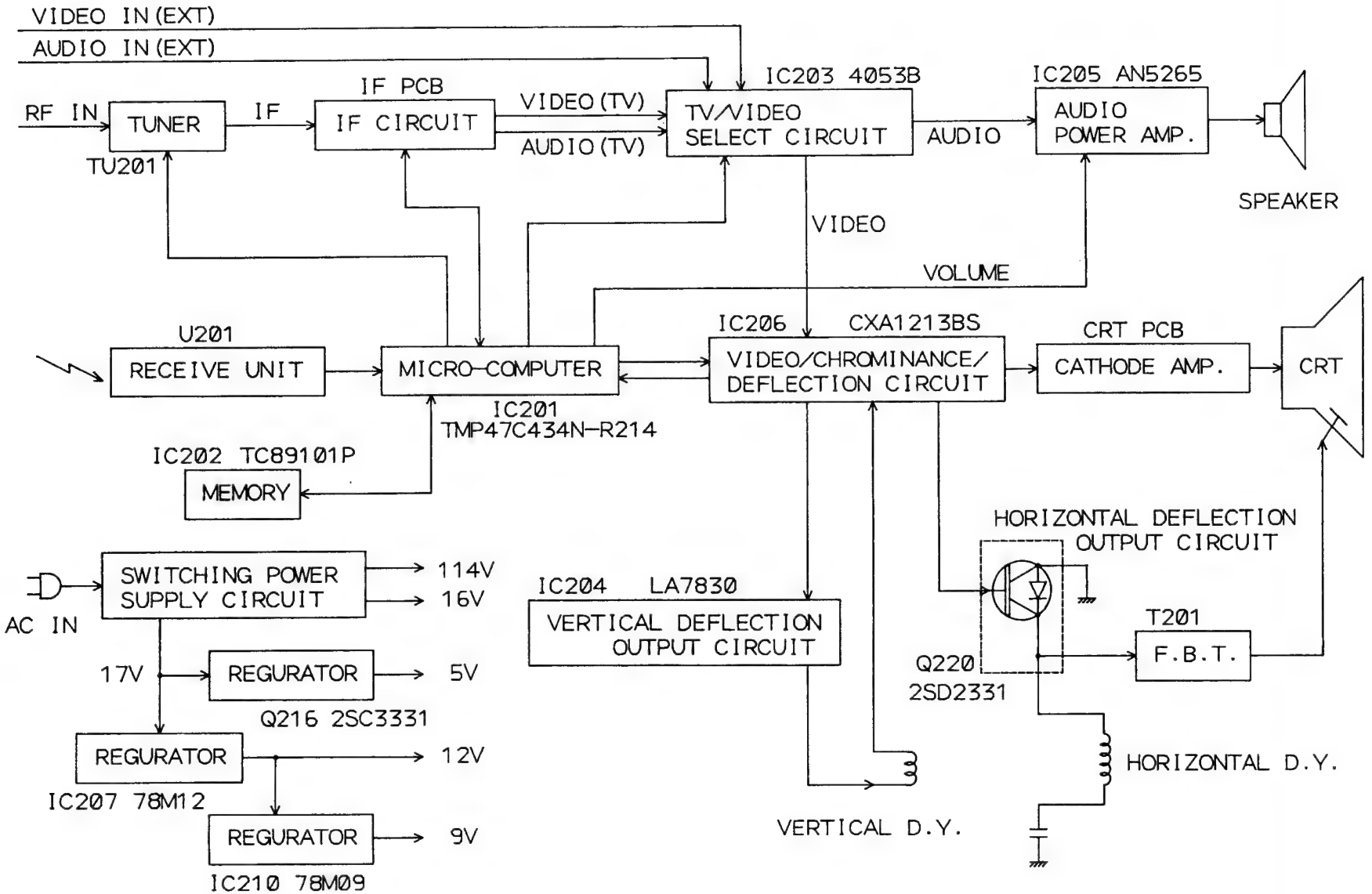


Reference Notes: VR602, VR603 --- CRT PCB

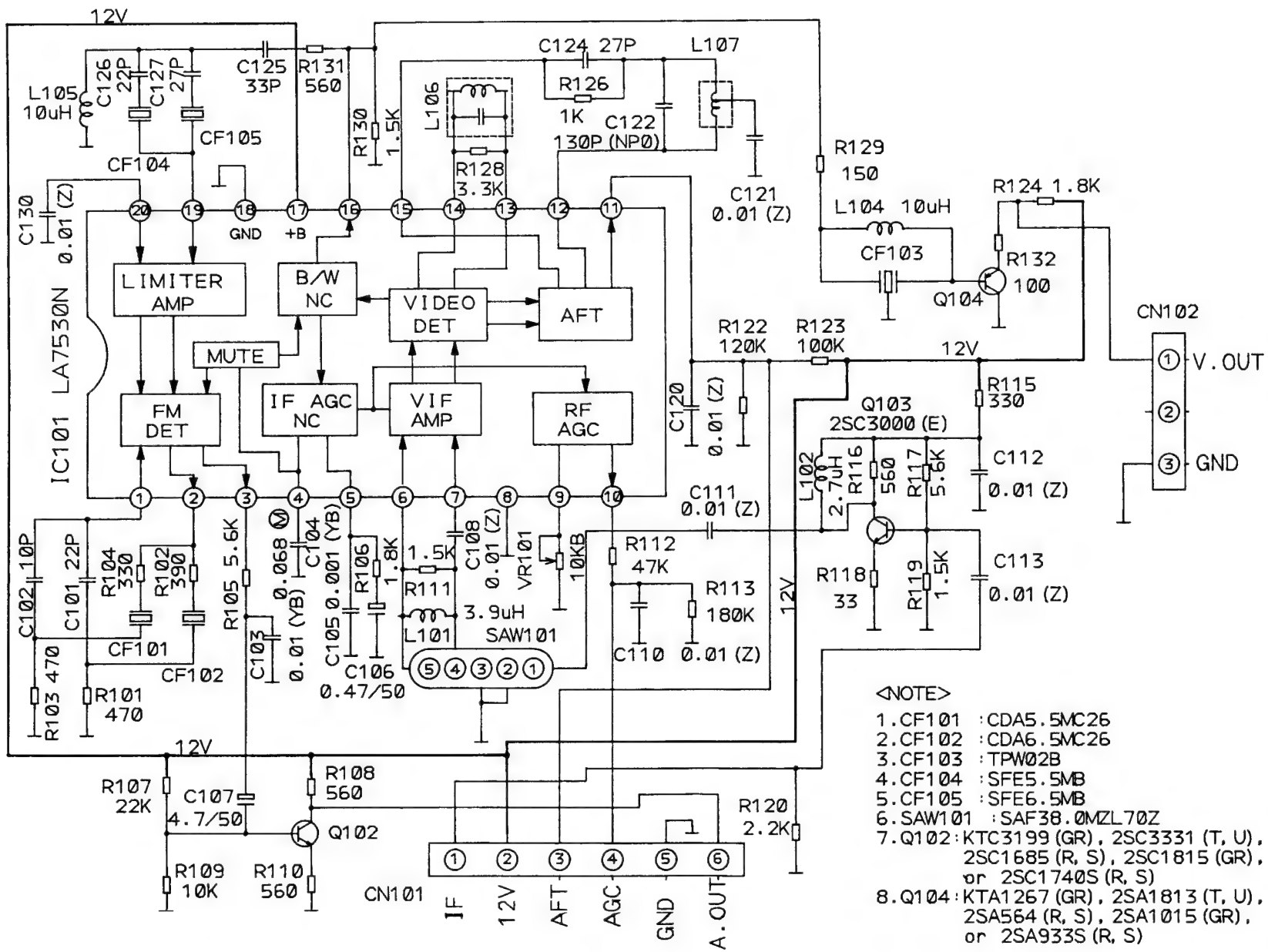
1. Operate the unit more than 20 minutes.
2. Face the unit to east. Degauss the CRT using Degaussing Coil.
3. Input the White Raster (APL 100%).
4. Set the color analyzer to the CHROMA mode and after zero point calibration, bring the optical receptor to the center on the tube surface (CRT).
5. Adjust VR603 (R. DRIVE) and VR602 (B. DRIVE) so that the respective chroma temperatures become 8000K-10MPCD (x : 0.300 / y : 0.290) ±4%.

Note: Confirm that Cut Off Adj. is correct after this adjustment, and attempt Cut Off Adj. if needed.

BLOCK DIAGRAM



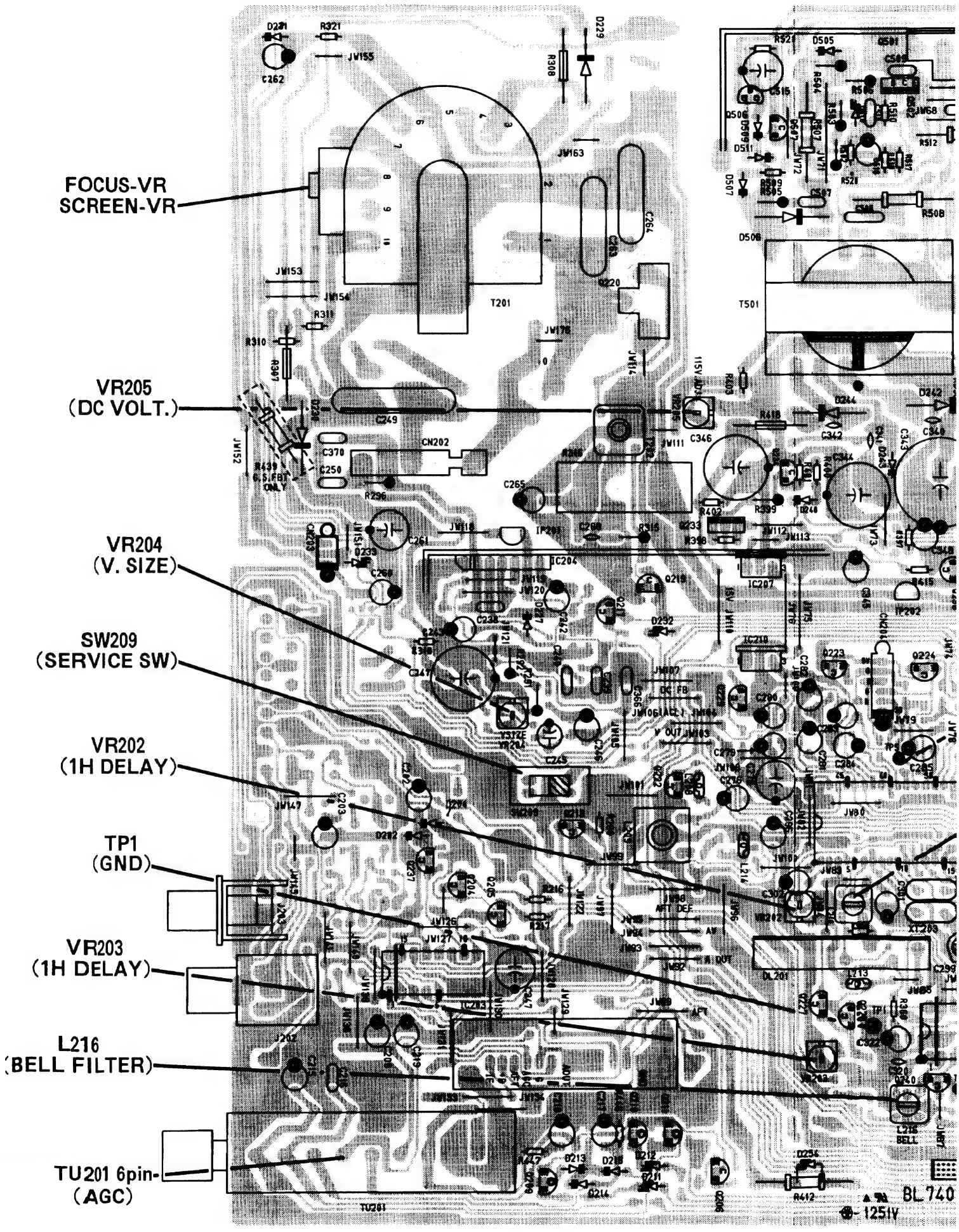
IF SCHEMATIC DIAGRAM

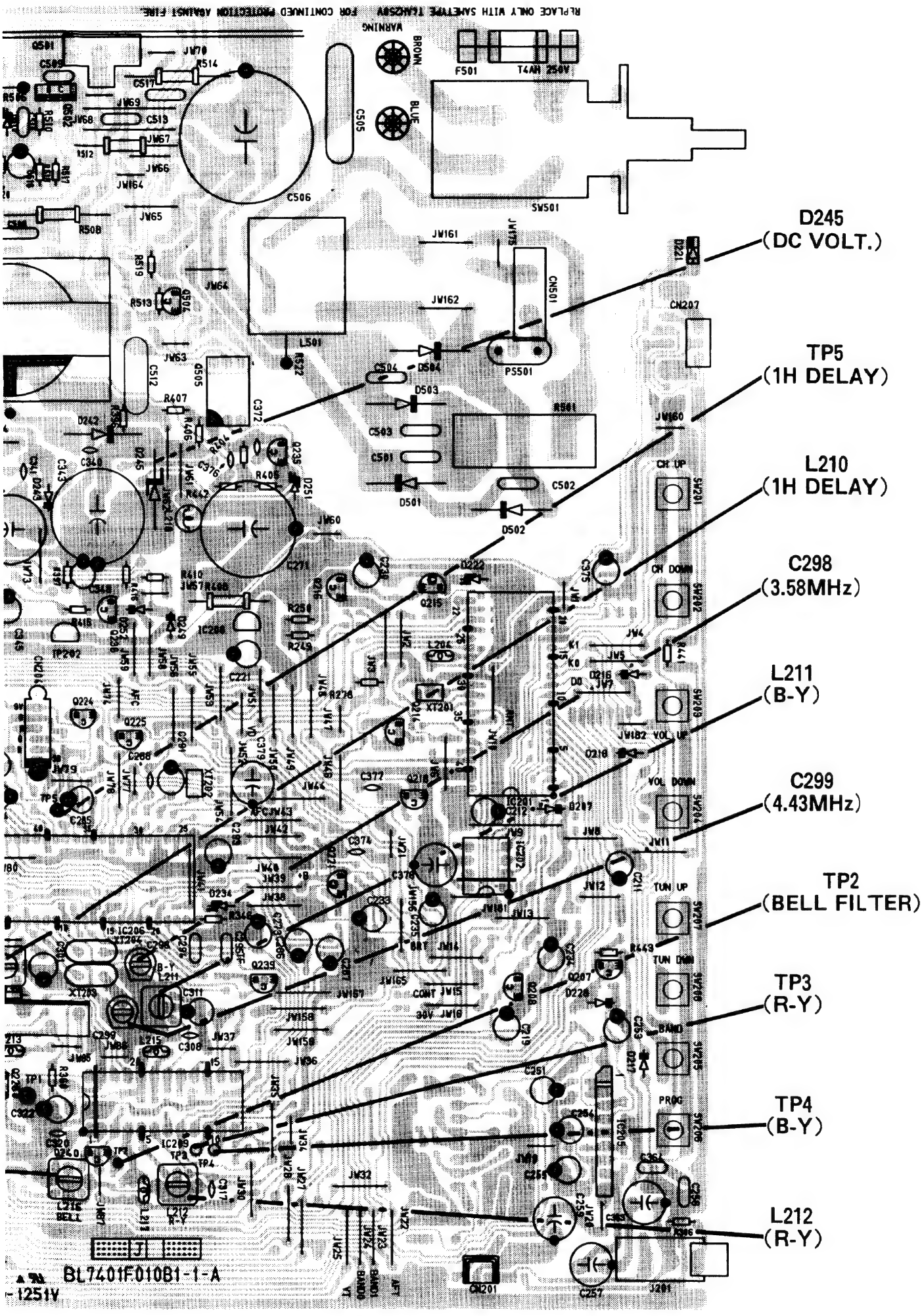


<NOTE>

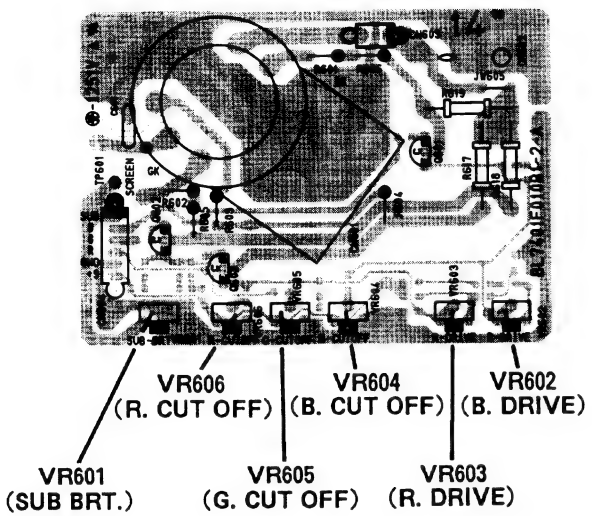
1. CF101 : CDA5.5MC26
2. CF102 : CDA6.5MC26
3. CF103 : TPW02B
4. CF104 : SFE5.5MB
5. CF105 : SFE6.5MB
6. SAW101 : SAF38.0MZL70Z
7. Q102 : KTC3199 (GR), 2SC3331 (T, U), 2SC1685 (R, S), 2SC1815 (GR), or 2SC1740S (R, S)
8. Q104 : KTA1267 (GR), 2SA1813 (T, U), 2SA564 (R, S), 2SA1015 (GR), or 2SA933S (R, S)

(L7531SC-IF)

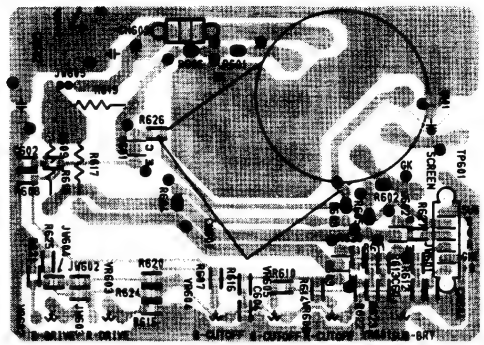

FOCUS-VR
SCREEN-VR
VR205
(DC VOLT.)
VR204
(V. SIZE)
SW209
(SERVICE SW)
VR202
(1H DELAY)
TP1
(GND)
VR203
(1H DELAY)
L216
(BELL FILTER)
TU201 6pin-
(AGC)
T201
T501
BL740
1251V


D245
(DC VOLT.)
TP5
(1H DELAY)
L210
(1H DELAY)
C298
(3.58MHz)
L211
(B-Y)
C299
(4.43MHz)
TP2
(BELL FILTER)
TP3
(R-Y)
TP4
(B-Y)
L212
(R-Y)
BL7401F010B1-1-A

CRT PCB (Top View)

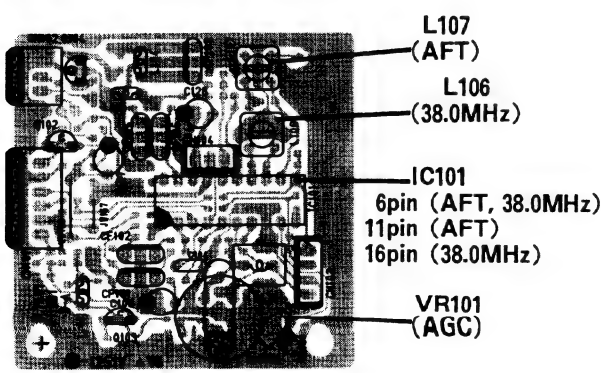


CRT PCB (Bottom View)

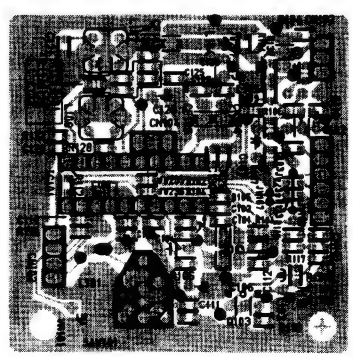


(BL7401F010B1-2-A)

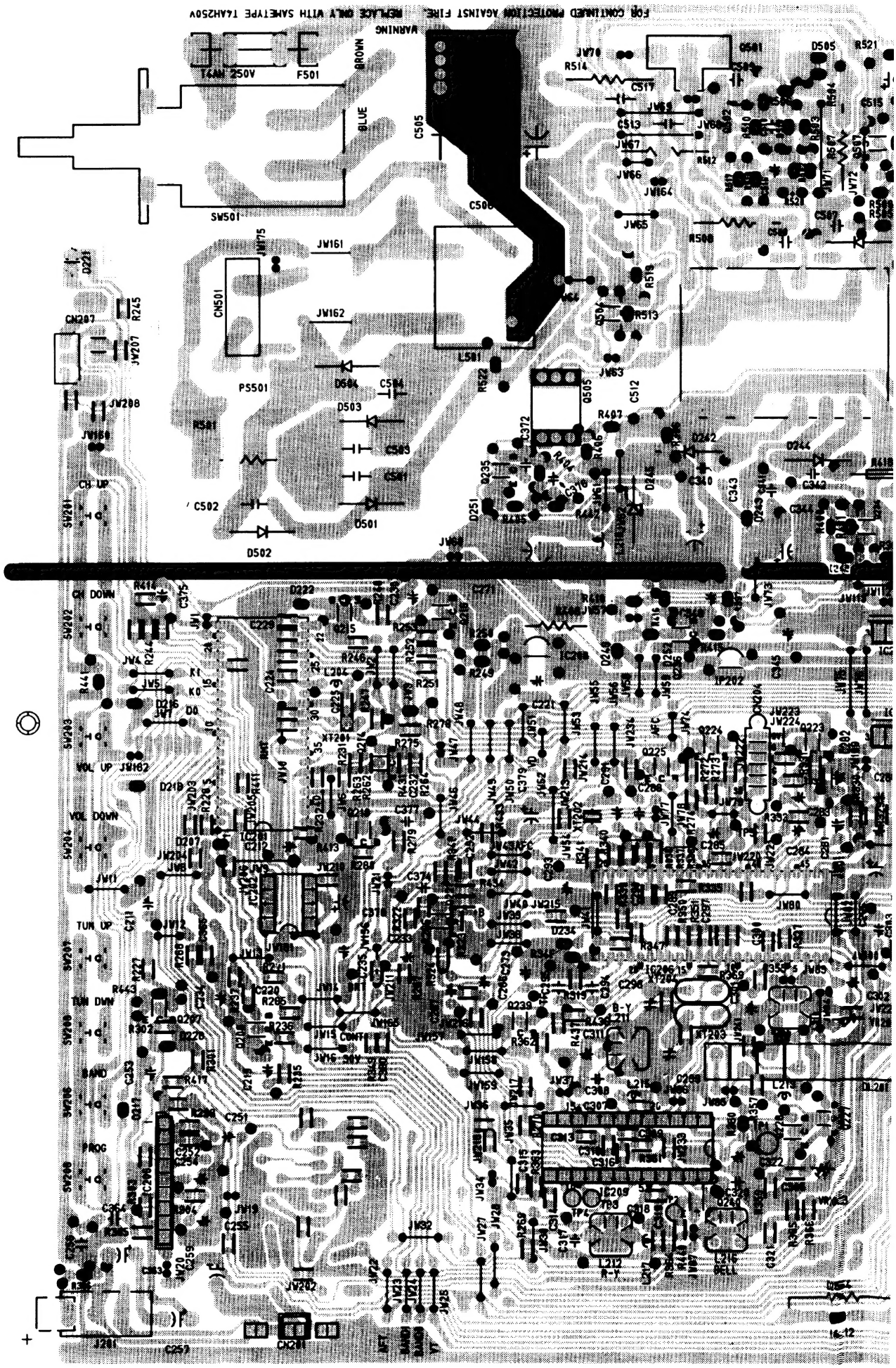
IF PCB (Top View)



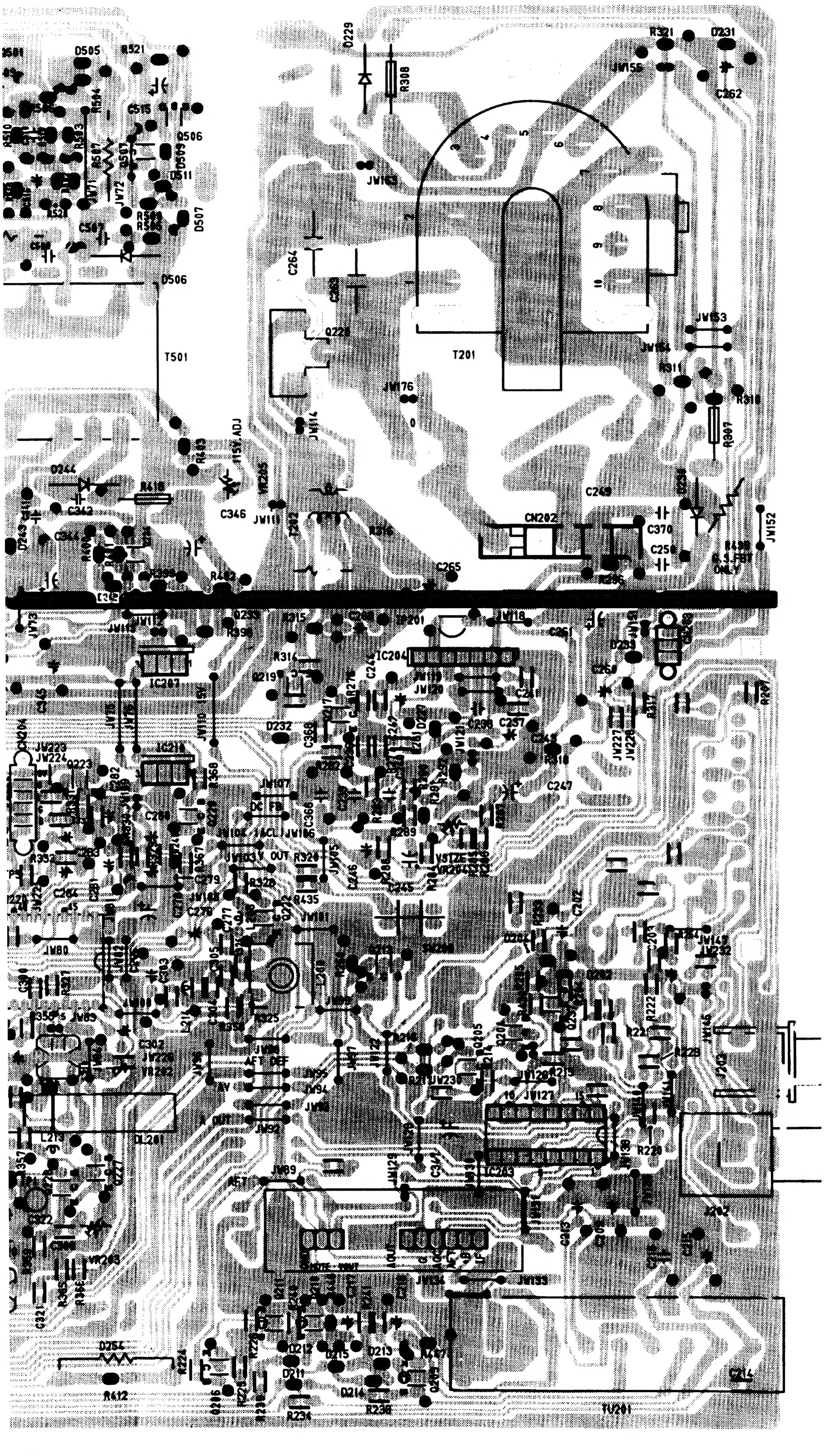
IF PCB (Bottom View)



(BL7401F010B1-3-A)


FOR CONTINUED PROTECTION AGAINST FIRE REPLACE ONLY WITH SAMETYPE T4AH250V
WARNING
T4AH 250V
F501
BROWN
BLUE
SW501
CN501
PS501
L501
D501
D502
D503
D504
D505
CH UP
CH DOWN
VOL UP
VOL DOWN
TUN UP
TUN DWN
BAND
PROG
J201
CN201
CN202
CN203
CN204
CN205
CN206
CN207
CN208

(Bottom View)



D505
R521
D506
D507
T501
D229
R308
R321
D231
JW156
C262
JW163
C264
Q228
T201
JW176
JW153
R311
R310
R307
D244
R416
C346
C342
C344
JW111
VR205
R316
C249
CN202
C370
C250
C265
R390
Q233
R315
IP201
JW118
C261
R314
Q219
IC204
IC207
JW120
D232
C368
IC219
CN204
JW223
JW224
Q223
C247
C366
JW107
R328
R435
C279
C277
JW80
JW101
JW85
C302
JW226
VR202
L213
DL201
C322
C306
VR203
AFT DEF
A OUT
JW95
JW94
JW93
JW92
JW89
AFT
JW127
JW126
IC203
R220
J202
R229
JW134
JW133
D254
R412
R224
D212
D215
D213
D211
D214
R234
R236
TU201
C214

<NOTE1>

Value of C264 is different from kinds of CRT and FBT.

FBT \ CRT	510UFB22 -TC52 (DPY)	A48KMX12XX44	51GGB95X-TC01
FCM-20B031	0.0018 1.6KV	0.001 1.6KV	0.0012 1.6KV
154-177T	0.0033 1.6KV	0.0018 1.6KV	0.0022 1.6KV

<NOTE2>

Value of R321 is different from kind of CRT.

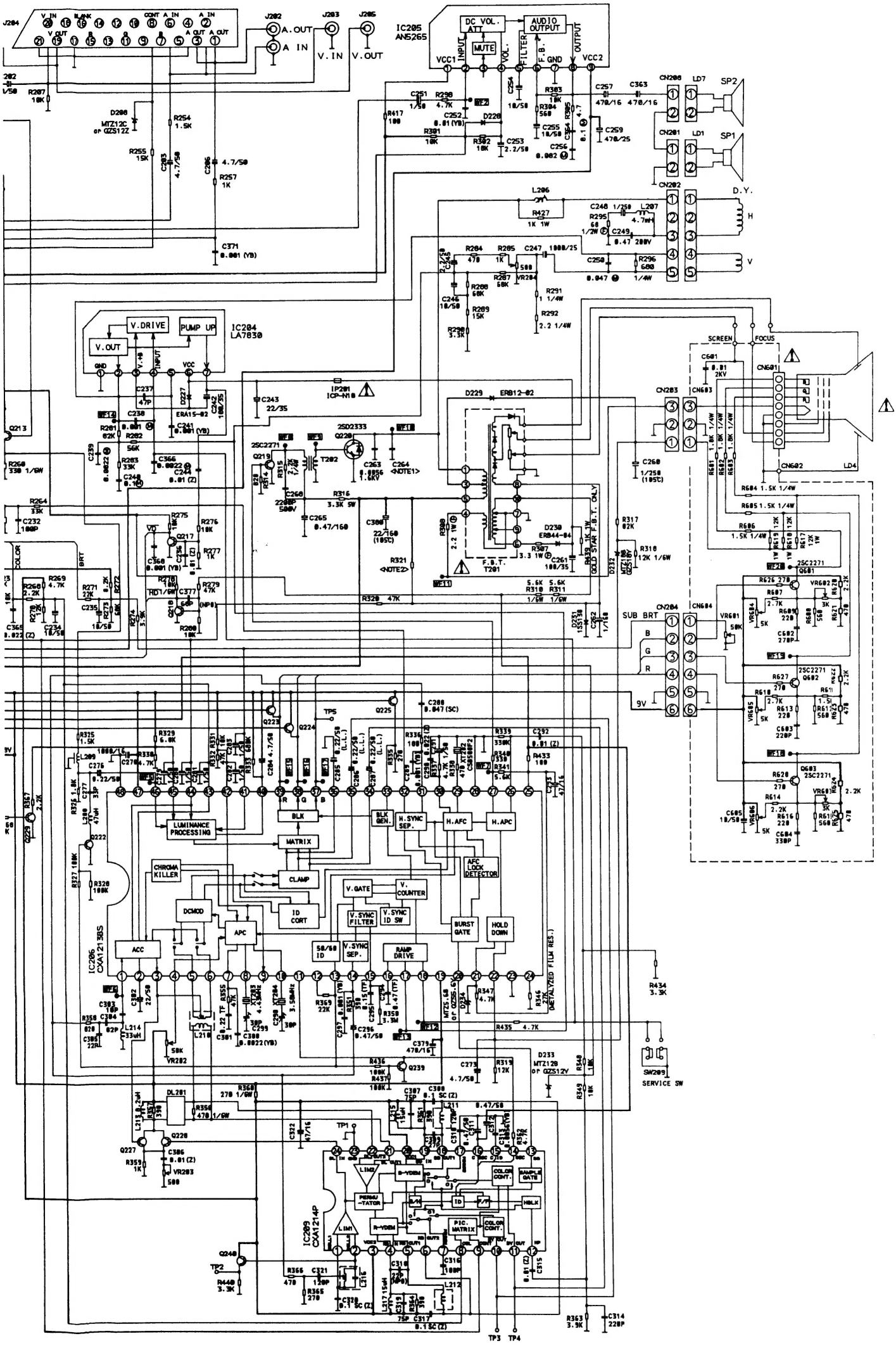
CRT	510UFB22 -TC52 (DPY)	A48KMX12XX44	51GGB95X-TC01
R321	180K 1/6W	150K 1/6W	180K 1/6W

CAUTION:
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE T4AH 250V FUSE.
ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQUES
D'INCEIE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE T4AH 250V.
RISK OF FIRE - REPLACE FUSE AS MARKED.

T4AH 250V

<NOTE3>

1. No indicated NPN type transistors are used KTC3199(GR), 2SC1740S(R, S), 2SC3331(T, U), 2SC1685(R, S) or 2SC1815(GR).
2. No indicated PNP type transistors are used KTA1267(GR), 2SA933S(R, S), 2SA1318(T, U), 2SA564(R, S) or 2SA1015(GR).
3. No indicated diodes are used 1SS133 or 1SS176.


IC205 AN5265
DC VOL.
ATT
AUDIO OUTPUT
MUTE
VCC1
INPUT
VOL.
FILTER
F.B.
GND
OUTPUT
VCC2
J202
A. OUT
A IN
J203
V. IN
J205
V. OUT
CN200
LD7
SP2
CN201
LD1
SP1
CN202
D.Y.
H
V
IC204 LA7830
V.DRIVE
PUMP UP
V.OUT
GND
V-FB
INPUT
VCC
SCREEN
FOCUS
CN601
CN603
CN602
LD4
CN283
CN684
CN604
SUB BRT
B
G
R
9V
IC206 CXA1213BS
LUMINANCE PROCESSING
BLK
BLK GEN.
H.SYNC SEP.
H.AFC
H.APC
MATRIX
CHROMA KILLER
CLAMP
AFC LOCK DETECTOR
V.GATE
V. COUNTER
DCMOD
ID CORT
V.SYNC FILTER
V.SYNC ID SW
APC
BURST GATE
HOLD DOWN
ACC
50/60 ID
V.SYNC SEP.
RAMP DRIVE
IC209 CXA1214P
LIM2
R-YDEM
COLOR CONT.
SAMPLE GATE
PERMU -TATOR
ID
F/F
HBLK
LIM1
PIC. MATRIX
SW209
SERVICE SW
TP1
TP2
TP3
TP4